ANNUAL REPORT

OF THE

State Engineer and Surveyor

OF THE

STATE OF NEW YORK

For the Fiscal Year Ended September 30, 1908

TRANSMITTED TO THE LEGISLATURE JANUARY 28, 1909

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No. 27.

IN ASSEMBLY

JANUARY 28, 1909.

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OFFICE OF THE STATE ENGINEER AND SURVEYOR,

ALBANY, N. Y., *January* 28, 1909.

To the Honorable the Speaker of the Assembly:

SIR.— I have the honor to transmit herewith the annual report of my predecessor, Hon. Frederick Skene, for the fiscal year ended September 30, 1908.

Very truly yours,

FRANK M. WILLIAMS,

State Engineer and Surveyor.

OFFICE OF THE STATE ENGINEER AND SURVEYOR,

ALBANY, N. Y., *December* 31, 1908.

HON. FRANK M. WILLIAMS, *State Engineer and Surveyor-elect:*

SIR.— I inclose herewith for transmittal to the Legislature, my annual report for the fiscal year ended September 30, 1908.

Very truly yours,

FREDERICK SKENE,

State Engineer and Surveyor.

REPORT

To the Honorable the Legislature of the State of New York:

I have the honor to present herewith my second annual report as State Engineer and Surveyor of New York.

The duties of the State Engineer and Surveyor, as provided by the Constitution of the State, the Revised Statutes and the various laws that are passed at each session of the Legislature, are many and have grown to such proportions within the last few years as to make his department one of the largest and most important in the state, but in general the State Engineer and Surveyor is charged with the duty of designing and supervising the engineering operations needed in the construction and maintenance of State public works. This report gives in detail the manner in which he has carried out these duties.

In planning, constructing and repairing the canals of the state, the State Engineer and Surveyor has found his principal occupation in former years, and this canal system will doubtless continue to be his chief care in the future, but for the last eleven years a new form of public improvement — the building of State highways — has taken his attention, the magnitude of the work and the amount of detail having become such that during the past year they have demanded more than half of his time. However, this duty is soon to pass to other hands, chapter 330, of the laws of 1908, having provided for the appointment of a commission to have entire charge of highway improvement throughout the State.

For this work of improving the highways the State Engineer and Surveyor has made the surveys and plans, advertised and awarded the contracts and has had entire charge of construction, while in progress, and of maintenance, after the highways have been improved and turned over to the counties. He also has had a supervising control over the repair and maintenance of highways in towns that have adopted the money system of taxation. Al-

though much has been accomplished in former years, the past season has witnessed the greatest activity along this line since the State undertook the work, many more miles having been built than during any previous year and much more having been contracted for. It is a noteworthy fact that, of the hundreds of miles advertised for letting, every piece of work, except three, has found a bidder and the contract has been awarded.

In addition to the duties emanating from his relations to canals and highways, the State Engineer and Surveyor is called upon to make maps for the use of the Attorney-General in the defense of suits before the Court of Claims; he is entrusted with the sale of lands under water; he is required to examine the plans for town and highway bridges, when submitted to him, and to examine and pass upon bridge plans presented by electric or steam railways for use in crossing the canals and improved highways; he is often directed by the Legislature to survey and monument boundary lines between counties of the state or between New York and adjacent states or Canada; he is charged with directing the Geological Survey of the state in coöperation with the United States government, including the topographic survey and the gaging of flow of streams; and he is often requested to furnish estimates and reports on proposed legislation, and to perform other allied duties for the Legislature.

Additional duties devolve upon the State Engineer and Surveyor by reason of his membership of various boards and commissions, from which many subjects are referred to him for examination and report.

These boards and their duties are as follows:

The Canal Board.— Controlling the construction and maintenance of canals.

The Board of Commissioners of the Land Office.— Controlling the sale and purchase of State lands, and the granting of lands under water.

The Board of State Canvassers.— Canvassing the returns of elections.

The Board of Equalization of Assessment.— Equalizing the assessment of State taxes among the several counties.

Barge Canal, Contract No. 17.
Movable dam of bridge type being built at Amsterdam. View shows the concrete sill under construction.

CANAL MAINTENANCE.

During the past year the maintenance of the present canal system has been continued under the provisions of the general and special acts of the Legislature, the design and construction of the various works specified by these acts having been carried on under the direction of the State Engineer.

As in the past, the specifications have been modified wherever necessary in order to keep abreast of the times and in accord with the latest and most approved methods employed by engineers in the design and construction of similar works. The preparation of these standard specifications has received continued attention.

One of the recognized features of modern and improved construction, is the constantly increasing use of Portland cement concrete as a substitute for the more expensive cut-stone masonry, which was formerly used. Concrete is now generally specified for masonry structures and the requirements and the tests of Portland cement have been advanced and modified to accord with the great improvement made in recent years by American manufacturers, with the result that none but the best qualities of cement are used on State work. The best laboratories in this and other States have been visited, and their methods considered and adopted where it was thought desirable, so that the State now possesses one of the best laboratories in the country.

BARGE CANAL.

The building of the Barge Canal — a project worthy of the great Empire State — has demanded the careful attention of a large portion of the State Engineer's Department during the past year. It is probable that but a small proportion of the people of the state comprehend the magnitude and the importance of this great undertaking, and this ignorance or indifference on the part of the large majority has led to a general impression that little, if anything, is being done toward its accomplishment, and that even its friends and promoters do not hope for its completion within either a reasonable time or the limit of the original appropriation. This idea has been encouraged by occasional statements that have appeared in the public press, based upon antiquated or fictitious figures, purposely failing to take into consideration the

months, nay years, required to adequately prepare, by surveys, soundings, borings, studies and plans, for the careful and proper execution of so gigantic an undertaking.

It is believed that a careful and unbiased review of what has been done thus far, and especially within the last twelve months, will show that the progress has been rapid and that the cost is even less than was anticipated.

STATUS OF THE WORK.

During the calendar year 1908, awards to the amount of $13,-421,752 were made, so that there are now in force contracts for building 194 miles of canal, the contract price for these being $35,-739,213, including all alterations to date. This means that nearly one-half of the whole project, both in length and in cost of construction, is at present under contract.

In my report of a year ago I stated that probably before the close of 1908 plans for all important contracts on the canal would be finished. This prediction has been fulfilled and now the plans for all except some forty-seven miles of canal are completed, including the three branches — Erie, Champlain and Oswego — and the plans for these forty-seven miles are about 90 per cent finished.

PROGRESS IN 1908.

During this year almost five and one-half million dollars worth of construction work has been done — an amount which is almost two and a half times that of 1907 and exceeds by nearly eight-fold the work of 1906. In the latter part of the past season the work was progressing at the rate of almost a million dollars' worth a month.

COMPARISON BY YEARS.

It has been five years since the law authorizing the Barge canal was ratified by popular vote, but lest it be said that it has taken these five years for the actual work of construction, and further that they indicate the rate of progress to be expected, it may be noted that the first contract was let in April, 1905, and that but $330,120 had been expended to the close of that year; that the amount had reached $1,042,926 at the end of 1906, and $3,257,-

Barge Canal, Contract No. 27.
Lock No. 8, near Fort Edward, in course of construction. Width of lock is well shown.

461 by the last of 1907, while the total expended to the close of 1908 is $8,701,323. Thus, nearly nine-tenths of the actual construction so far accomplished has been done within the past two years, and nearly three-quarters of that amount within the past year. In this connection it should be noticed that several of the contracts have been awarded so recently that almost nothing has yet been done, the contractors being engaged in assembling the huge working plants required, this in itself being necessarily a matter of several months. When these contracts, and others soon to be advertised, begin to add their quota to the general results, a rapid increase is inevitable.

CONTRACTS LESS THAN APPROPRIATIONS.

It is of considerable interest to observe that of the work covered by the contracts now in force, the estimates upon which the appropriation of 1903 was made, amounted to $38,667,642, and that the subsequent estimates of the engineers upon this same work were $37,373,528, and this without sacrifice either of design or of quality of workmanship, and including also the substitution of locks 45 feet in width instead of 28 feet, of movable dams in the Mohawk river east of Little Falls instead of rock-filled, timber-crib dams, as originally contemplated, and of a grade lowered six feet at the western end of the canal. The contracts for this work were let for the gross price of $35,764,052. This is a clear saving of 4 3/10 per cent from the engineer's estimates, and a greater saving of 7½ per cent from the appropriation estimates of 1903.

PROGRESS OF CONSTRUCTION WORK.

As stated previously, there are now under contract 194 miles of canal at prices which total $35,739,213. These contracts cover the following stretches of work:

Erie canal.— Waterford to Rexford Flats; Crescent, Vischer's Ferry, Yosts, Canajoharie, Fort Plain, Mindenville, Scotia, Rotterdam, Cranesville, Amsterdam, Tribes Hill; Mindenville to Castle creek; Little Falls; Delta Reservoir; near east end of Oneida lake; Brewerton to Lyons; Irondequoit creek; Rochester to Monroe–Orleans county line; Eagle Harbor to Beal's bridge; Medina to Lockport, and Lockport to Ellicott creek.

Champlain canal.— Mechanicville, Stillwater, Northumberland; Northumberland to Whitehall.

Oswego canal.— Fulton; Oswego.

FEDERAL AID FOR CANALIZING THE HUDSON.

In my annual report of a year ago I stated that one portion of the work which was included in the original estimate had not been planned for, inasmuch as it was hoped that the National Government would undertake this part — the canalization of the Hudson between Congress street bridge, Troy, and Waterford. Surveys had already been made by the United States engineers and a favorable report made to Congress, but the project had not been acted upon by Congress at that time and still no action has been taken. During the past year, however, I have taken steps to place this matter more clearly before the Rivers and Harbors Committee of Congress, and I trust that before long this action may be rewarded by the giving of Government aid. I prepared a memorial to the Congress of the United States, asking for this federal assistance, setting forth, in what seems to me, many almost unanswerable arguments the reasons for seeking this help. In his annual message to the Legislature of 1905 the Governor called attention to the fact that New York's share of the amount appropriated for rivers and harbors was but a trifle compared with the percentage which our commerce bears to the whole commerce of the United States and he suggested that our representatives in Congress be requested to press the claims of the State for larger appropriations. About a year later this was followed by an appeal by my predecessor for the Government to undertake the canalization of the Hudson between Troy and Northumberland and now I have made this appeal to Congress. The canal interests, as represented by the various commercial and civic associations throughout the state, are generally opposed to federal aid in constructing the main line of the Barge canal, since it is thought that dependence on this aid would delay the ultimate completion of the work. But it seems entirely just to ask the general Government to assist in the portions at the termini of the canal. The United States has already in effect pledged itself to the construction in Niagara river between Tonawanda and Lake

BARGE CANAL, CONTRACT NO. 4.
View looking towards Sylvan Beach bridge and showing piers of a concrete approach to the bridge.

Erie and work has been in progress there for some time. It seems important that the members of the State Legislature and the representatives of New York State in Congress should most urgently press the claims of New York.

This measure has also been prominent in two large waterway conventions which have recently held annual sessions — the Atlantic Deep Waterways Association and the National Rivers and Harbors Congress, and resolutions embodying this feature were adopted at one of these conventions.

It is fairly well known that in the federal operations for improvement of the upper Hudson river channel during the last five years, calculations have been based upon a channel twelve feet deep by 300 feet wide. The assertion is made, however, that we are to have such a channel at mean low water, but the objection has been made that at the height of the navigable season, when the river boats are loaded with their heaviest freights, the mean low water phase is non-existent and that we actually have extreme low water, which is practically two feet lower than the mean low water standard. This gives us but a ten-foot channel, which at two points, at least, is not more than fifty feet wide. Here steamers of size dare not meet or pass except at risk of accident. The Albany Chamber of Commerce has for several years been urging a deeper channel for the Hudson. Within a year or so, in order to realize the benefit of added strength from those interested, correspondence has been had with the officials of various places along the Hudson river. This has resulted in the organization of the Hudson River Improvement Association, which advocates a twenty-two-foot channel in the Hudson connecting with the terminus of the Barge canal at Waterford.

To gain the added strength of coöperation I have joined forces with these State and National associations, thus hoping to obtain a proper outlet from the present terminus of the Barge canal at Waterford to the port of New York. In making this appeal for aid it seems wise that the Government should be petitioned also to assume responsibility for harbor facilities in Lake Champlain at the port of Whitehall and in Lake Ontario at the port of Oswego.

TERMINAL FACILITIES.

In my report of last year I called attention to the need of improved terminal facilities for canal traffic at the ports of Buffalo and New York, so that the capacity of the Barge canal shall not be limited by the present inadequate provisions. This need continues to grow more pressing and is worthy of speedy and careful consideration.

RECOMMENDATIONS.

It is recommended that the Legislature coöperate with this Department in further endeavors to induce Congress to make appropriation for the work of canalizing the Hudson river from Troy to Waterford.

The Barge Canal Law allows the Superintendent of Public Works, at his discretion, to reject all proposals at any opening of bids and to readvertise for new tenders. I recommend that the law be amended so as to permit him to reject *any* or *all* bids, so that he may exclude those that seem to be unbalanced.

BARGE CANAL BULLETIN.

Early in 1908 I began issuing a monthly bulletin devoted to Barge canal matters. This publication, known as the *Barge Canal Bulletin*, has met with considerable success. Its purpose is to furnish accurate and timely information concerning the Barge canal to all who may be interested. It serves to keep in close touch with the work, the contractors, the manufacturers of machinery and supplies, and all who may be instrumental in building the canal, and thus it aids in securing active competition among bidders. Incidentally it saves a large amount of correspondence,— in answering questions that would otherwise be asked by these interested people.

The *Bulletin* also imparts a knowledge of the whole work to the many officials and employees engaged in its prosecution, and so it enables all to labor together harmoniously, with a more comprehensive view of the entire project.

But the field of the *Bulletin* is broader than the mere company of those who have business relations with the canal. The people of the state at large have ordered the building of this waterway

Barge Canal, Contract No. 35.
Concrete wall between Barge canal channel and Oswego river.

and it seems proper that they should be informed concerning its progress. Thus this publication has a mission to the general public, and to meet this demand, its circulation includes the press of the state, State officers and State departments, members of the Legislature, the judiciary of the state, the boards of trade and chambers of commerce, the mayors of cities, many libraries and institutions of learning, besides various technical, business and social bodies and a list of individuals.

In addition to detailed records of each contract or set of plans, summaries are given each month of all work done, together with timely notes of things attained, so that a glance may serve to reveal the size of the undertaking and the progress that is being made in its accomplishment. Also there have been included in the *Bulletin* articles written in a popular style and descriptive of certain structures, machinery or localities accounted of interest to a wide circle of readers. Moreover, technical terms are excluded from its pages as far as possible and local names are used in denoting the places where work is being done.

HIGHWAY IMPROVEMENT.

UNDER HIGBIE–ARMSTRONG LAW.

The work of highway improvement has materially increased during the past year. The season was an exceptional one for good roads work, as weather conditions were almost ideal, there having been very few lost days on account of rain. These unusual conditions have permitted the completion of many roads on wet, clay soils that would not otherwise have been finished.

From January 1, 1908, to December 31, 1908, inclusive, 809 miles of roads were completed, making a total of 1,787 miles of improved highways in the State. The following table gives a comparison of the progress of the good roads work during the years in which the Higbie-Armstrong law has been in operation.

A division of time according to the calendar year is used, inasmuch as these dates cover the working season. In previous annual reports statistics for the fiscal year, beginning October 1, have been given, while the annual bulletin issued by this Department has contained a tabulation for the calendar year. To avoid confusion and to include a full working season, this change is made.

Comparison of progress during period in which the State aid law has been in operation in New York state.

DURING YEAR.	State appropriations.	Appropriations by counties.	Mileage of roads adopted by counties.	Mileage of completed improved roads.
1898	$50,000	$63,872	21	0
1899	50,000	42,876	9	5
1900	150,000	431,227	130	35
1901	420,000	1,055,874	247	20
1902	795,000	1,748,115	418	126
1903	600,000	2,198,623	427	112
1904	1,108,265	2,032,855	422	158
1905	50,000	1,974,423	427	117
1906	*5,000,000	1,724,286	332	94
1907	*3,000,000	2,881,071	558	311
1908	*3,000,000	1,033,034	354	809
	$14,223,265	$15,186,256	3,344	1 787

*Part of this appropriation advanced for payment in first instance of entire cost of roads in some counties.

On December 31, 1908, there were under contract 520 miles of highways and 1,038 miles on the list awaiting contract. The total estimated cost of improving these roads is $10,624,910. The counties' and towns' share of the cost of construction has already been appropriated. Plans and specifications have been approved for 354 miles of roads during the year, and plans and specifications for many miles are now before the boards of supervisors, awaiting approval, or are about ready to be sent to the boards.

The Department has continued the experiments begun in 1906 with asphaltic oils, tarvia, etc., but the results obtained have been too uncertain to allow any definite conclusions to be drawn. There are several preparations and pavements that have made their appearance, but none of them has been sufficiently tried in this state to say that the proper solution has been found. The remedies which have been tried consist in sprinkling with asphaltic oil, the application of tarvia, both by the painting and mixing methods, and the use of rock asphalt screenings as a binder for the top course.

Of these methods the use of rock asphalt binder has been the most permanent and satisfactory, as well as the most costly. The extra cost of these screenings, however, is offset somewhat by the saving in manipulations and the cost of other stone screenings. The surface produced seems to be smooth, durable and dustless and admirably to withstand the effect of swiftly moving motor-

cars. Specifications have been prepared and adopted for Erie and Monroe counties for a considerable quantity of this class of macadam, the most of which is now under contract and will be built the coming season.

The application of oil has continued with very good results. It is a cheap way of laying the dust and of preventing the finer particles of the macadam from being blown away, with the consequent raveling of the surface. To be successful, oiling should be repeated often. Most of the recent contracts have contained the item of oiling, upon which the contractors have been required to bid. This provision will eliminate the cost for maintenance for some time.

The results of the application of coal tar, or tarvia, have been of varying degrees of success and failure.

The mixing of asphaltic oil with the natural soil has not been tried by this Department.

The appended reports of the division engineers give in detail the status of all road work in the state.

MONEY-SYSTEM ROADS.

During the past year the work of the Money System Bureau has been in part as follows:

It has had supervision over 650 towns, comprising a mileage of 54,745 miles. In these towns taxes were levied for highway purposes amounting to $1,757,583.49, for which State aid amounting to $1,062,674.29 was paid and extraordinary repairs amounting to more than $40,000 was made, giving a total of $2,859,857.78 available for highway purposes. This does not include the amounts that have been expended for bridges nor the amounts that have been audited for highway commissioners' salaries, since these figures cannot be ascertained at present, as the supervisors and highway commissioners have not yet made their annual report to the Department, but on the basis of the expenditure for the year 1907 there will be approximately $1,300,000 expended for these purposes. There have been 753 inspections made in these towns, covering a mileage of 13,946 miles.

During the winter schools of instruction were held in 295 towns of the state, most of these being towns in which such schools had

never been held before. The object of these schools was to instruct the officials in their duties for the coming year. At the same time accounts were audited. There has been an audit of accounts made in 309 towns.

From the estimate blanks received, it is shown that there will be levied for highway purposes this year an amount equal to about \$2,300,000, upon which State aid of approximately \$1,500,000 will be paid, and it is also shown that there is about \$1,000,000 levied for bridge and other miscellaneous purposes, making a total fund available for the coming year for highway, bridge and miscellaneous purposes of nearly \$5,000,000, not including any balances that will be carried over from this year's fund nor amounts which will be transferred from the excise fund to the bridge and miscellaneous funds. There are many towns which maintain all their bridges from the excise fund; there are a large number of towns that have built and maintained their bridges under section 10 of the Highway Law and doubtless these towns will hereafter build and maintain their bridges under section 93 of the new Highway Law. Neither does this total include the highway commissioners' salaries which are audited by the town auditors on auditing day.

THE NEW HIGHWAY LAW.

Inasmuch as a new highway law is about to make radical changes in the administration of highway improvement, taking the work from the supervision of this Department, under which it has been since its inception in this State, it is purposed here briefly to state a few of the provisions of this law.

Chapter 330 of the Laws of 1908, known as the Highway Law, which will take effect on January 1, 1909, creates a department of highways composed of three members, to be appointed by the Governor by and with the advice and consent of the Senate.

On and after January 1, 1909, all work pertaining to highways and bridges which are constructed, improved or maintained in whole or in part by the aid of State moneys will be under the supervision of this Commission.

Article III, section 30, of this Highway Law provides that the county board of supervisors may appoint a county superintendent, determine the amount of his bond, fix his salary, etc. The term

View of a portion of the completed gravel road.

View of a portion of the completed gravel road on a new location.

CHATHAM–CHATHAM CENTER ROAD, No. 342, COLUMBIA COUNTY.

of office of the superintendent is also fixed in the law at four years, unless removed by the board or by the Commission upon written charges, after an opportunity to be heard, for malfeasance or misfeasance in office.

The duties of the county superintendent will be to have charge of all highways and bridges within his county, to supervise the construction and repair of State highways, as provided by law, and the repair of bridges. He is also charged to advise and direct the town superintendent how best to repair, maintain and improve highways and bridges in his township; to inspect, or cause to be inspected, if directed by the board of supervisors, each county highway during its construction or improvement and certify to the board the progress of the work and report to the Commission any irregularities of the contractor or any failure on his part to comply with the terms of the contract. He is also directed to report to the Commission annually in relation to bridges and highways in his territory; to examine and approve plans for county highways; to examine the various formations and deposits of gravel and stone in his county, for the purpose of ascertaining the materials which are best available and suitable for the improvement of highways therein, and when requested by the Commission, submit samples of such formations and deposits and make a written report in respect thereto.

Provision is also made for the appointment by the Commission of district superintendents to take charge of the work in those counties in which the boards of supervisors fail to appoint a county superintendent. The district superintendent will have all the powers of the county superintendent.

The law further provides for the election of a town superintendent, who will take the place of the highway commissioner under the old law. The town superintendent will have duties similar to those of the highway commissioner, besides many additional duties assigned to him by the provisions of the new law and by the rules and regulations of the Commission. The powers and duties of town superintendents have been greatly increased under the new law and the office will be much more important than the former office of highway commissioner.

Article V provides for the raising of a tax for highway and

bridge purposes, which hereafter must be a money and not a labor tax, as formerly. The article also provides for the expenditure of this tax and defines the duties of county and town clerks in connection with the law.

Article VI, section 120, deals with highways to be constructed and improved by the State and enumerates certain routes which will be known as State highways and are to be constructed or improved at the sole expense of the State. These roads cover all the counties of the state, except those embraced by the city of Greater New York, distribution among the various counties having been made on an equitable basis in so far as such a basis was practicable.

Section 122 deals with the construction of county highways or highways to be constructed at the joint expense of the State, county and town. The percentage of cost which the State, county and town shall pay is the same as that provided for in the Cobb Act of 1907.

There is no material change in this new law in the manner in which boards of supervisors may petition for highways to be improved or in the preparation and submission of plans for such improvement to the boards of supervisors for approval. The law does prescribe, however, the manner in which bids shall be invited for such improvement, and stipulates that the bidder must bid both the price for each item enumerated in the proposal and also a lump sum for which he will perform the work required by the contract. In awarding the work the Commission must award the contract to the bidder who names the lowest gross sum for which he will do the entire work.

Article VII, which deals with the maintenance of State and county highways, provides that estimates shall be prepared by the Commission and submitted to the Legislature, naming the amount of money necessary to maintain and repair the State and county highways each year, and that the appropriation made by the Legislature annually for this work shall be distributed according to these estimates to the several towns of each county. The Comptroller upon the requisition of the Commission is authorized to draw his warrant upon the State Treasurer in favor of the county treasurer of the county in which the State or county highways

Construction begun.

Construction finished.

CARMEL–KENT ROAD, No. 570, PUTNAM COUNTY.

shall be located, for an amount which shall not be in excess of the total amount appropriated by the Commission to all the towns in such county. The money so paid, together with the sum of fifty dollars for each mile or major fraction of a mile of the total mileage of State and county highways within the county, which shall be raised by the several towns, shall be deposited by the county treasurer to the credit of the fund for maintenance of State and county highways in the several towns of the county. The amount appropriated by the Commission for the maintenance and repair of State and county highways in each town, together with the amount paid therefor by such town, shall be expended for the repair and maintenance of such highways in such town.

Other articles of the law have to do with the laying out, altering and continuing of highways, private roads, etc., the repair, maintenance and construction of bridges, and other miscellaneous performances.

RECOMMENDATIONS.

It seems to me but just that the automobiles should pay a tax, the amount of which should be regulated by weight and horsepower, and that this tax should be paid into the State treasury and set apart to be used exclusively for the maintenance and repair of improved highways.

Under the provisions of the State Constitution it is impossible to construct improved highways through the State forest preserve. This restriction should be removed so as to permit the State, or the counties and towns together with the State, to make improvements on the highways running through the preserve which have been in existence a number of years. If new roads are to be opened to aid in fighting forest fires, the Highway Commission and the Forest, Fish and Game Commission should work in harmony, and any roads or system of highways should have the approval of the Highway Commission.

At certain times in the past automobile races have been held upon some of the improved State highways, much to the detriment of the highways. Some prohibitive or restrictive measure, legislative or otherwise, should be enforced, and never should any event of this character be allowed without at least holding the race promoters responsible not only for the damage done by the racing

cars in practice and during the race, but also for the injury occasioned by the thousands of cars drawn to the locality that would not otherwise be attracted.

THE MACADAM HIGHWAY PROBLEM.

In my annual report a year ago, I deemed it "my duty to call your attention to the injurious effect of rapidly driven power vehicles upon the public highways of the State, especially those of macadam surface."

I quote from that report:

"Ten years ago the Higbie-Armstrong bill became a law, as the first notable effort of the State to break away from the antiquated methods in vogue during the previous century and give to its citizens well-built and permanent highways in return for the money expended on their construction. This law was not placed upon the statute books without a twenty years' struggle of the few advocates of improved highways, led by the League of American Wheelmen, then a strongly organized body of users of the roads.

"The natural reluctance of the people to try expensive experiments and to make costly innovations, although the success of macadam roads had been proved in adjoining states, made necessary a long campaign of education before the law could be passed. The leading argument was that the farmers would be better provided for in marketing their crops. To this end they were permitted by the law to petition for a section of highway to be built in front of their holdings and were assessed according to their benefits, or practically according to their frontage, in partial payment therefor. At that period the use of the highways by automobiles to any considerable extent was neither foreseen nor considered.

"Within the past six years the State has built a thousand miles of macadam highways and is planning to build thousands more. Millions of dollars have already been expended for the purpose and millions more will be required. The question of maintenance of these highways is but in its infancy. Neither macadam nor any other kind of highway will last forever without constant repair and maintenance, and the rapid deterioration of

View of the road under construction.

View of a completed portion.

HIGHLAND LAKE–TOMPKINS COVE ROAD, NO. 593, ROCKLAND COUNTY.

their surface from any cause means the expenditure of more money to maintain them.

"It is only within the past two or three years that the remarkable increase in the number of automobiles as well as in their weight and speed has made noticeable their effect upon the public highways. This damage appears to be caused in two ways. First, by the so-called suction of the broad rubber tire of a swiftly moving wheel upon the finely comminuted material of the wearing surface and binder, causing it to be displaced and thrown out to the rear, thus exposing the jagged corners of the top course of macadam, which are in their turn reduced to fragments and removed from place by the same agency. Second, by the direct picking action of numerous devices now used to roughen the surface of the tire and thus obtain a stronger hold upon the smooth surface of the finished road, by the use of chains and other appliances, termed in general nonskidding devices and intended to prevent side-slip of the wheels, especially in wet weather, or at high speed, or at turns in the road.

"It is to be observed that speed is an essential element in causing the injury in both the cases named. The higher the speed of the machine, the greater the injury inflicted. The law now permits no greater speed than twenty miles per hour upon the open highways of the State, yet it is a matter of common knowledge that this law is 'more honored in the breach than in the observance.'

"It will be observed that the injury complained of is not confined to this State, but is coexistent with improved road systems, whether of macadam or other surfacing. It will also be observed that speed is an essential element to produce the injury referred to, slow moving automobiles causing less injury in this regard.

"Numerous experiments have been made both in this State and elsewhere, by the use of tar, crude oils and other liquids, and their effect has been carefully observed. It is conceded that the dust nuisance has been obviated to a considerable extent wherever they have been properly used. Sufficient time, however, has not elapsed since their use to form definite opinions as to their ultimate value. It may be said that they are open to the objection of continued expense of repeated applications and that at best they are only palliative and not curative."

After the lapse of a year from the time when the above was written there seems to be no occasion to withdraw or even modify a single line or syllable of this statement. What was true a year ago is doubly true to-day. If the question was important then, it has become of tenfold importance with an added year of observation and experiment.

Within the past year the Empire State has well maintained its position in the vanguard of the crusade for better roads. Eight hundred miles of splendid new macadam highway have been thrown open to the public and added to its former mileage. The experiments with surface preparations in this and other states have been continued and their results watched with the keenest anxiety by the leading road experts of the country. These results are as palliative, and as palliative only, as they were a year ago. Much has been written upon the subject. Numerous conventions have drawn together practical road-builders from all parts of the country for an interchange of opinions. And finally, scarcely three months ago the greatest International Road Congress the world has ever known convened at the city of Paris, France, for the purpose of permanent organization and discussion.

In all this writing, in all this consensus of opinions expressed, there is to be noted a remarkable unanimity of conclusions. And the dominant note of the President of the Paris Congress, ringing high and clear above all others, in his address of welcome to the delegates, was: How shall we build and maintain our highways, to withstand the changed conditions required by modern automobile traffic?

The broken-stone road of to-day is the result of more than a century of development. Since the days of Tresauget, of McAdam and of Telford, though variant in methods of construction, its purpose has remained unchanged — to meet the wear of iron-tired, horse-drawn vehicles at a reasonable cost. Until the advent of the motor-car these conditions have been fairly met and the broken-stone road has been so far satisfactory. But conditions now have radically changed. The macadam road of to-day is being rapidly denuded of its binding material and its wearing surface disintegrated. The construction methods of the past will not meet the requirements of the future, or even of the present. Either the

traffic which produces this disastrous result must be restricted or new methods, however expensive, must be used in construction, to meet the conditions which confront us. Does any sane man who has followed this question, believe for a moment that the first alternative will be realized? It follows, then, that the sooner the second alternative is adopted, the better for all concerned.

Fines and license fees, to any reasonable extent, do not reach the root of the difficulty, nor will they meet more than a tithe of the expense involved.

Happily for my successors, the Legislature in its wisdom has seen fit to transfer the responsibility of meeting this emergent problem from the shoulders of this Department. Under these circumstances, suggestions as to future methods of construction would be obviously superfluous. It is devoutly to be hoped that those who have been intrusted with this responsibility will be given wisdom to meet it. With no desire whatever to hamper their efforts in this direction and with this frank and final note of warning to the people of the state, this Department must, of necessity, be content.

TESTING LABORATORY FOR STATE WORKS.

For many years the State Engineer's Department has included a testing laboratory where are made tests of all hydraulic cements used for State work, not only for the numerous works which are under the direction of the State Engineer, but also for those supervised by the State Architect, in the many buildings which he constructs. The character and importance of the work being done on the Barge canal has also necessitated the testing of sand submitted for use in the large concrete structures. Another important branch has been the testing of stone for use as road surfacing in the improvement of public highways. The engineer who is in charge of this general testing laboratory has made visits to many of the best equipped laboratories in this country and at all times keeps fully informed as to the latest and most-approved methods.

The methods of cement testing are in accord with the latest and best practice and insure the use of none but the best cements for State work. The high grade of requirements has been maintained during the year, thus keeping up with the improved methods and products of American manufacturers of Portland cement.

The work of testing stone has been well inaugurated during the past year. The extent of highway improvement over the whole state and the great variety of possible road metal found in the several localities have necessitated this branch of work, so as to protect the State from the liability of expending large sums on improvements that will not be durable. With this plant, also, the important work of testing stone for use in the large concrete structures of the Barge canal is performed. But one laboratory in the country is as complete in its machinery for testing stone — the one connected with the Office of Public Roads, U. S. Department of Agriculture, at Washington, D. C.

The testing laboratory of this Department is one of the best equipped and most complete of its kind in the country and the work done is generally considered as being standard.

COURT OF CLAIMS SURVEYS.

To aid the Court of Claims in having a full understanding of the claims which come to trial before it for damages alleged to have been caused by the canal and its works, engineers of this Department have made surveys and presented evidence on behalf of the State, with the result that much money has been saved for the State through the disallowance of unjust claims.

This Court is now almost exclusively engaged in disposing of Barge canal claims, and the preparation of expert evidence for these cases devolves upon the engineers of this Department. This includes the gathering of much data and the ability of these engineers to qualify as experts in their respective branches of the profession. The hydraulic questions involved in much of the litigation are probably the most important and the records that the State Engineer's Department has been accumulating for years are of inestimable value. Since the beginning of work on the Barge canal, the official photographers of this Department have made a complete photographic record of lands or buildings appropriated, as well as a pictorial history of the progress of construction. These views are also of much value as evidence before the Court.

Accounts of the work thus done will be found in the appended reports of the division engineers.

It is recommended that the Legislature appropriate $5,000 for the continuation of this work.

LAND BUREAU.

This bureau of the State Engineer's Department has charge of the sale of State land and of the custody and care of ancient records. The ancient records of this Department, as well as the modern ones, are of great value for reference, and it has been the policy through recent years to add to them whenever this can be done without cost to the State.

The State Engineer is intrusted by the Commissioners of the Land Office with the public sale by auction of State lands, including those acquired for unpaid taxes. At these sales men are sometimes in attendance whose sole purpose seems to be one of blackmail. By threatening to bid up the property, they often extort money from the former owner, or else they compel him to pay a sum largely in excess of the unpaid taxes by carrying out their threats. Under the law I am powerless to prevent this occurrence, and in equity to the prior owners the case seems to call for legislative action.

Doubtless this obnoxious practice may be stopped by an amendatory clause to chapter 317 of the Laws of 1894, the statute which defines the duties of the Commissioners of the Land Office. By extending the privilege of redemption up to the time of the public sale, in permitting the prior owner upon application to purchase the property at private sale for an amount which shall cover the total expense to the State for such property, including unpaid taxes, interest and costs, it would appear that the trouble may be obviated.

I therefore recommend that you enact such remedial legislation as in your wisdom seems best.

The detailed report of the engineer in charge of the Land Bureau of this Department will be found appended to this report.

BUREAU OF BRIDGES.

This bureau was established in 1899 by an act of the Legislature (chapter 476), which provided for a chief bridge designer and necessary assistants. For several years prior to that time the growing demand for lift-bridges over the canals and the intricate character of their design had brought about the practice of having the plans for State bridges prepared by the engineering depart-

ments of some bridge company. Subsequently these bridge companies would submit bids for the bridges they had designed. The formation of this bureau has resulted in a uniformity of design in bridges, which was lacking when they were designed by private firms, and also in bringing the preparation of plans and the inspection of construction entirely within the control and knowledge of this Department.

Since the commencement of making plans for the Barge canal, this bureau has become absolutely necessary. In January, 1904, it was transferred to the Barge canal office. Its size and scope have been largely increased, and since then at least ninety-five per cent of the work of the bureau has been in connection with the Barge canal. Now it has supervision of preparing plans, specifications and estimates for the construction of bridge superstructures, substructures, and approaches, lock-gates, lock-valves, needle-dams, movable-dams and other forms of steel structures required for building the Barge canal.

This bureau also has charge of the mill and shop inspection of all metal work in connection with Barge canal and other structures. On account of the large attendant expense it has proved impracticable for the State to have men in its employ located at the mills and shops for the purpose of making the necessary inspection required by the specifications on amounts of material comparatively so small. Such inspection, therefore, has been regularly made by a firm of inspecting engineers, appointed by the State Engineer. These engineers are able to make the inspection at a low cost, because their representatives inspect large quantities of material for other clients in connection with the materials inspected for the State. Reports of such inspections are regularly received and upon receipt are carefully examined in detail and placed on file.

The bridges over existing canals in the state often call for expert inspection and this is performed by the bureau of bridges upon request from the Superintendent of Public Works. If repairs are necessary, plans also are furnished by the bureau.

The bureau also has the duty of examining plans submitted by electric and steam railway companies for new bridges over the canals, or for strengthening existing bridges.

By the provisions of section 145 of the Highway Law, town officials have been able to avail themselves of the services of this bureau in inspecting and certifying to the proper construction of iron or steel bridges exceeding 200 feet in length, or having a span or spans exceeding 100 feet in length, before the structure was accepted and paid for. If the plans and specifications for these bridges were submitted to the State Engineer for his approval, the bridge bureau was charged with their examination. Under the law of 1908 this duty will hereafter devolve upon the State Highway Commission.

STATE BOUNDARY LINES.

By chapter 678 of the Laws of 1892, the State Engineer and Surveyor is authorized and directed to make an examination every three years of all of the monuments marking the boundary lines of the State; if any such monuments be found injured, missing or displaced, he is directed — acting in conjunction with the duly recognized authorities of the adjoining State — to replace such monuments. The total length of the State boundary lines is 1,416 miles, comprised as follows: Canada line, 431 miles; Vermont line, 171 miles; Massachusetts line, 50½ miles; Connecticut line to Long Island Sound, 81 miles; along the ocean around Long Island to the New Jersey shore, 246 miles; New Jersey line, 92½ miles; Pennsylvania line, 344 miles to the beginning of the Canada line in the middle of Lake Erie. These boundaries are fixed by accepted agreements and are marked by natural watercourses or by monuments.

When the State boundary lines were last examined by men assigned for the purpose by this Department, it appeared that nearly all of the monuments were in a satisfactory condition, except those along the Connecticut line. The New York–Connecticut division line, from Long Island Sound to the southerly boundary of Massachusetts, a distance of about 80 miles, was in dispute for nearly 200 years, or until 1860. Then it was established by a commission representing the State of New York, and was marked by a hundred marble or iron monuments, but their condition has been unsatisfactory for several years. For some time efforts have been made by New York officials to induce the Connecticut authorities

to coöperate in remonumenting this line, but without success till the present year. The work of resurveying and remonumenting this line has been begun but will not be completed until next year. The report of the engineer in charge will therefore be reserved until the next annual report. To complete this Connecticut line and to make the examinations of other State lines, as the State Engineer and Surveyor is directed to do by law, I recommend the appropriation of $5,000 at the coming session of the Legislature.

CO-OPERATIVE SURVEY OF STATE.

Survey of New York State in Co-operation with the United States Geological Survey.

TOPOGRAPHIC SURVEY.

For several years prior to 1893 this Department urged the passage of an act to provide for the coöperation of the State of New York with the United States Government for the purpose of securing an accurate topographic survey and map of the State of New York. This recommendation was finally adopted and the work was authorized by chapter 287, Laws of 1893. From 1893 to the present time this survey has steadily progressed and now it is rapidly approaching completion. The agreement between the United States Geological Survey — the department having the matter in charge for the Federal Government — and the State Engineer's Department, acting on behalf of New York State, is that each shall pay one-half the expense of the surveys and that the Federal Government shall pay all of the expense of engraving plates and printing the maps therefrom. The State's share of the cost has been provided by annual appropriations by the Legislature, the United States Government contributing an amount equal to the appropriation made by the State.

The maps are printed in sheets about 20 inches by 16½ inches in size, on a scale of about one inch to the mile, and show all roads, waterways, mountains, hills and valleys, railroads, towns, villages, cities, etc. The state has been divided into 260 quadrangles, each shown on one sheet.

No other map of the state has ever been published upon so large a scale nor in such detail, and the information presented is of great value to many in the state and especially to several of the

State departments — in the work of highway improvement, in the operations of the Forest Preserve Board and in examinations which are constantly being made for water-supplies for existing and proposed canals and for various cities and towns. These maps are in constant and growing demand by those who are planning any kind of work of improvement in the state, giving as they do the means of making, without the delay and expense of field-work, preliminary locations for water-storage and water-power development, railroad lines and highway improvement. The State has thus obtained maps of great value and usefulness at less than half their actual cost.

In 1905 the State Legislature failed to appropriate the customary sum of $30,000 for the coöperative survey and during the year the Federal Government transferred a portion of its available funds to the work in other states. Upon the resumption of appropriations by the State in 1906, it was found that only about $10,000 remained available as the share of the United States to continue the work. Large demands for these surveys are being made upon the Government by other states and still larger demands will be made in the near future. It seems wise that the Legislature should return to its practice of appropriating $30,000 at the coming session, so as to induce the National Government to supply a like sum to hasten the completion of the survey in this State before the needs of other localities becomes so great as to further delay operations here. I therefore recommend the appropriation of $30,000 for this purpose.

Hydrographic Survey.

Since 1900 there has existed a coöperative agreement between New York State and the United States Government to engage in making measurement of the volume of streams and flow of water, each bearing one-half of the expense. With the exception of 1905 this work has been carried on jointly. In 1905 the State failed to make the usual appropriation and the United States Government assumed the whole expense, but discontinued several of the gaging stations which had been maintained chiefly for the benefit of the State. In that year no report of the gagings was made to this Department, but through the courtesy of the Director of the United

States Geological Survey, portions of the Government report were reprinted, so as to preserve the continuity of State reports on stream gaging.

Soon after the beginning of surveys for the Barge canal a bureau of hydraulics was established at the head office, and for the past three years this has been in charge of Robert E. Horton, Resident Engineer, formerly District Engineer of the United States Geological Survey for this section of the country. When the coöperative measurements were resumed in 1906 by New York and the United States Government, the Barge canal bureau retained the gaging stations it had assumed and the number of these stations has now become about one hundred. The elevations of water-surfaces, corresponding to gage readings, at all of these stations have been reduced to one datum (Barge canal datum) and the discharge measurements of a considerable number of gagings have been calculated. This bureau has become one of the indispensable adjuncts of this Department, for the results of its observations are necessary in properly designing plans for building the Barge canal. These records are also of great service in determining values for properties acquired or damages sustained. They are useful, too, in considering propositions for water-power and storage, and extensive studies, based on these gagings, have already been made for propositions of this character. Certain stations serve as measures of protection to guard State interests and others against approaching floods. Several stations are maintained for this purpose in conjunction with the United States Weather Bureau. The Bureau of Hydraulics has taken over several stations formerly maintained by the United States Government or by individuals or corporations, in order that long-existing records may be continued permanently and without interruption, for the value of gaging records increases with their duration, and only from observations of many years can accurate averages be determined and extremes of low water and floods be ascertained. The United States Geological Survey now maintains thirty-four stations in this state. Mr. H. K. Barrows, District Hydrographer, with an office at Boston, Mass., now has charge of the coöperative measurements.

The latter part of 1908 was a season of protracted drouth

throughout the greater part of the United States and consequently extreme low water conditions prevailed in all of the streams. The opportunity thus afforded of obtaining valuable data was not neglected, but new gaging stations were established on several additional streams, and hundreds of current-meter measurements were taken on various streams, so as to determine the low-water stages of all watercourses in the vicinity of the State canals and also the streams and lakes furnishing their supply of water. In the coöperative work similar gagings were made in other portions of the state. The importance of these low-water records to the State for use in designing public improvements must be evident to all. Their value to many throughout the state who depend on the streams for power or water-supply is shown by the number of requests already received for copies of these gaging records.

I recommend that $2,500 be appropriated by the Legislature for continuing the work of stream-gaging in coöperation with the Geological Survey.

CONCLUSION.

The appended tables will show the engineering expenses during the fiscal year, all contracts that have been or are in force and a record of all highway improvement since its inception. The appended reports of the division engineers and of the heads of various bureaus will show in detail the work and expenses of the Department as well as give a record of some of the data obtained.

This Department has been probably the largest and surely one of the most important in the state. To it have been intrusted interests of a magnitude greater than those which occupied the whole State Government but a few short years ago. For carrying on these great enterprises a large force of assistants has been necessary and to them is due an expression of my appreciation for the way in which they have performed their duties.

Throughout the whole fiscal and calendar years the work of the Department has been under my supervision. Mr. Frank L. Getman has filled the position of Deputy State Engineer, taking charge of work other than Barge canal construction and consisting chiefly of highway improvement, while Mr. William R. Hill

has acted as Special Deputy State Engineer, with the duty of supervising all Barge canal work.

In closing I wish to express my gratitude to the several State officials, the Legislators and the many others who, through courtesies and assistance, have helped me to perform the duties of my office.

Respectfully submitted,

FREDERICK SKENE,

State Engineer and Surveyor.

Engineering Expenses for the Fiscal Year Ended September 30, 1908

Table of Contracts Completed During the Fiscal Year Ended September 30, 1908

Table of Contracts Pending September 30, 1908

Table of all Contracts Awarded for Highway Improvement under Chapter 115, Laws of 1898, and Amendments Thereto

Engineering Expenses for Fiscal Year Ended September 30, 1908.

Ordinary Repairs to Canals.

WORK.	Act. Chap.	Act. Year.	Division.	Amount.	Total.
Erie canal	577	1907	Eastern	$8,131 16	
Champlain canal	577	1907	Eastern	3,868 84	$12,000 00
Erie canal	577	1907	Middle	$9,000 00	9,000 00
Erie canal	577	1907	Western	$8,501 61	8,501 61
Total	.....	.....	....	....	$29,501 61

Construction of Barge Canal.

WORK.	Act. Chap.	Act. Year.	Division.	Amount.	Total.
Barge canal, head office account	147 143 172	1903 1905 1907	Eastern	$243,931 29	
Erie	147 143 172	1903 1905 1907	Eastern	138,067 27	
Champlain	147 143 172	1903 1905 1907	Eastern	78,736 89	$460,735 45
Barge canal, Erie	147 143 172	1903 1905 1907	Middle	$103,467 30	
Oswego	147 143 172	1903 1905 1907	Middle	43,532 90	147,000 20
Barge canal, Erie	147 143 172	1903 1905 1907	Western	$135,054 54	135,054 54
Total	.....	.....	....	....	$742,790 19

Improvement of Public Highways.

WORK.	Act. Chap.	Act. Year.	Division.	Amount.	Total.
Highway improvement	115	1898	Eastern	$510,052 88	
Maintenance and repairs	115	1898	Eastern	157,396 15	$667,449 03
Highway improvement	115 468	1898 1906	Middle	$205,265 00	
Maintenance and repairs	115 468 686	1898 1906 1906	Middle	48,490 00	253,755 00
Highway improvement	115	1898	Western	$126,152 14	
Maintenance and repairs	115	1898	Western	86,011 00	212,163 14
Total	.....	.....	....	....	$1,133,367 17
"Money System," repairs of highways	577 578	1907	Eastern	$44,448 00	$44,448 00

Special Work.

WORK.	Act. Chap.	Act. Year.	Division.	Amount.	Total.
North Salina street bridge, Syracuse	668	1906	Middle	$4,509 62	
Durhamville aqueduct	147 143 672 172	1903 1905 1906 1907	Middle	1,864 49	
Total	.....	.....	....	....	$6,374 11

Bureau of Bridges.

WORK.	Act. Chap.	Act. Year.	Division.	Amount.	Total.
Bureau of bridges	686 578	1906 1907	Eastern	$2,622 49	
Total	.....	.....	....	....	$2,622 49

Special Surveys.

WORK.	ACT. Chap.	ACT. Year.	Division.	Amount.	Total.
Examination of monuments and maps	686 466	1906 1908	Eastern	$594 59	
Court of Claims surveys	686 578	1906 1907	Eastern	1,428 04	
Topographic survey	578 466	1907 1908	Eastern	9,028 57	
Hydrographic survey	578 466	1907 1908	Eastern	1,930 48	
Mohawk street bridge, Waterford	265	1908	Eastern	450 80	
					$13,432 48
Court of Claims surveys	686 578	1906 1907	Middle	$1,329 17	
					1,329 17
Court of Claims surveys	686	1906	Western	$648 56	
Keuka lake outlet lighthouse	266	1908	Western	152 92	
Lyell avenue bridge, Rochester	287	1908	Western	341 00	
Allen street bridge, Rochester	291	1908	Western	605 83	
					1,748 31
Total	.....	.....	....	....	$16,509 96

Summary of Engineering Expenses for Fiscal Year Ended September 30, 1908.

DIVISION.	Ordinary repairs to canals.	Construction of barge canal.	Improvement of public highways.	Money system.	Special work.	Bureau of bridges.	Special surveys.	Total.
Eastern	$12,000 00	$460,735 45	$667,449 03	$44,448 00	....	$2,622 49	$13,432 48	$1,200,687 45
Middle	9,000 00	147,000 20	253,755 00	....	$6,374 11	....	1,329 17	417,458 48
Western	8,501 61	135,054 54	212,163 14	....	....	....	1,748 31	357,467 60
Totals	$29,501 61	$742,790 19	$1,133,367 17	$44,448 00	$6,374 11	$2,622 49	$16,509 96	$1,975,613 53

TABLE OF CONTRACTS COMPLETED DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908.

CONTRACTOR.	Date of contract.	Character of work.	Division.	ACT. Chap.	ACT. Year.	Appropriation.	Contract price.	Final payments.
Henry Tosh & Son	Mar. 12, 1908	Repairing the Montezuma turnpike bridge over the Seneca river, Seneca county	Middle	575	1907	$2,500 00	$1,786 00	$1,716 25
Theo. F. Kalbfleisch	Dec. 3, 1907	Constructing a new aqueduct under the Erie canal at Durhamville, Oneida county	Middle	672	1906	76,600 00	56,093 00	52,327 97

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work.	Division.	Contract price.	Final payments.
Orange County Road Construction Co	July 20, 1906	Chester–Vail's Gate road, No. 154–A, Orange county	Eastern	$25,833 00	$26,463 80
Orange County Road Construction Co	July 20, 1906	Woodbury–Central Valley road, No. 157, Orange county	Eastern	18,367 80	20,237 07
Orange County Road Construction Co	June 18, 1904	[illegible] No. 161, Orange county	Eastern	48,250 00	69,206 64
Corliss Construction Co	July 9, 1906	[illegible] o. 227, Rensselaer county	Eastern	25,900 00	28,050 70
John E Consalus	June 29, 1906	[illegible] o. 228, Ulster county	Eastern	40,800 00	53,661 18
Shanley Morrissey, Inc	Oct. 1, 1906	[illegible] No 229, Ulster county	Eastern	57,000 00	74,080 00
Joseph Walker	July 11, 1906	[illegible] 1) road, No 230, Ulster county	Eastern	63,439 00	81,434 09
McNamee & Rice	July 7, 1906	Post (section 1) road, No. 231, Ulster county	Eastern	52,250 00	60,560 15
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	Frankfort–East Schuyler road, No. 233, Herkimer county	Eastern	12,700 00	12,810 78
Morris Kantrowitz	Aug 30, 1906	Delhi Middletown road, No. 239, Delaware county	Eastern	46,775 00	46,559 84
John W Flynn	July 3, 1906	Cohoes–Waterford [illegible], No. 240, Saratoga county	Eastern	21,138 40	32,418 22
Schenectady Contracting Co	July 13, 1906	[illegible] d, No 241, Saratoga county	Eastern	30,669 00	33,401 66
Saratoga Trap Rock Co	July 13, 1906	[illegible] section 2) road, No. 242, Saratoga county	Eastern	8,513 40	8,558 20
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	Mechanicville–Stillwater road, No 243, Saratoga county	Eastern	18,000 00	25,556 30
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	Saratoga–Schuylerville road, No 244, Saratoga county	Eastern	55,000 00	53,623 43
Robert Shafer	July 12, 1906	Gloversville–Mecco–Phelps road, No. 246, Fulton county	Eastern	17,203 07	17,098 82
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	Johnstown–Keck Center (section 2) road, No 247, Fulton county	Eastern	40,000 00	38,225 71
Schenectady Contracting Co	Sept. 1, 1906	Gloversville–Broadalbin road, No. 248, Fulton county	Eastern	16,243 00	16,091 18
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	Plattsburg–Keeseville (section 3) road, No. 258, Clinton county	Eastern	36,000 00	48,221 77
Buckley Construction Co	July 6, 1906	Plattsburg–Mooers (section 2) road, No. 259, Clinton county	Eastern	55,894 00	59,496 25
Buckley Construction Co	Aug. 1, 1906	Plattsburg–Mooers (section 3) road, No. 260, Clinton county	Eastern	33,000 00	39,057 16
Ryan & Yale	July 6, 1906	Peekskill–Salem Center (section 1) road, No. 261, Westchester county	Eastern	43,233 00	44,720 26
Scofield Co	July 6, 1906	Peekskill–Salem Center (section 2) road, No. 262, Westchester county	Eastern	33,711 00	33,373 14

TABLE OF CONTRACTS COMPLETED DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908 — (Continued).

Improvement of Public Highways — (Continued).

CONTRACTOR.	Date of contract.	Character of work.	Division	Contract price.	Final payments.
De Graff & Hogeboom	Aug. 30, 1906	Greenville–Slate Hill road, No. 282, Orange county	Eastern	$56,865 00	$59,792 95
Orange County Road Construction Co	Sept. 4, 1906	Greenville Port Jervis road, No 283, Orange county	Eastern	57,350 00	63,799 50
Martin Murray	July 2, 1906	Averill Park-Crooked Lake road, No. 284, Rensselaer county	Eastern	27,660 00	32,132 83
Thomas H. Karr	July 7, 1906	[illegible] No 285, Rensselaer county	Eastern	31,500 00	31,764 64
Morris Kantrowitz	Aug. 30, 1906	[illegible] to 287, Rensselaer county	Eastern	35,349 00	40,203 73
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	[illegible] o 298, Montgomery [illegible]	Eastern	15,000 00	14,824 10
Joseph Walker	July 11, 1906	[illegible] orners road, No. 299, [illegible]	Eastern	27,000 00	26,372 10
Shanley Morrissey, Inc	Sept 3, 1907	[illegible] Montgomery county	Eastern	18,705 95	19,184 46
Town of Rochester	July 3, 1906	Kingston Ellenville (section 2) road, No. 305, Ulster county	Eastern	56,500 00	63,199 60
Shanley-Morrissey, Inc	Sept 3, 1907	[illegible], Ulster county	Eastern	51,927 30	51,385 12
Joseph Walker	Sept 3, 1907	[illegible] county	Eastern	58,579 45	58,214 19
Joseph Walker	Jan 10, 1908	[illegible] county	Eastern	43,009 69	47,690 65
Orange County Road Construction Co	Sept. 4, 1906	Middletown-Cuddebackville (section 1) road, No. 312, Orange county	Eastern	36,400 00	37,333 20
Shanley Morrissey, Inc	Sept 3, 1907	[illegible] (section 2) road, No. 313, [illegible]	Eastern	51,072 20	51,389 00
S B Van Wagenen	June 30, 1906	[illegible] No. 314, Otsego county	Eastern	37,000 00	52,782 85
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	[illegible] 15, Otsego county	Eastern	26,000 00	29,842 80
Silver & Gould	July 10, 1906	[illegible] Otsego county	Eastern	19,967 75	24,261 79
S. B Van Wagenen	June 30, 1906	[illegible] 319, Otsego county	Eastern	34,400 00	34,760 92
Bellew & Merritt	July 20, 1906	Peekskill Salem Center (section 3) road, No 331, Westchester county	Eastern	42,000 00	47,164 20
Bellew & Merritt	July 20, 1906	[illegible] nter (section 4) road, No 332, West- [illegible]	Eastern	34,690 00	35,898 45
Buckley Construction Co	July 6, 1906	[illegible] oad, No. 340, Saratoga county	Eastern	51,000 00	52,920 83
John W. Polcaro	July 6, 1906	[illegible] road, No. 341, Columbia county	Eastern	23,100 00	23,047 69
John W. Polcaro	Aug. 28, 1906	Chatham-Chatham Center road, No. 342, Columbia county	Eastern	7,500 00	7,229 60
Charles R. Lewis	July 10, 1906	Frankfort-Utica (section 2) road, No. 359, Herkimer county	Eastern	14,600 00	16,748 34

Ulysses G. Stockwell	July 9, 1906	ion 1) road, No. 361, Fulton	Eastern	20,149 00	20,267 60
Alonzo Schaupp	Sept. 3, 1907	re road, No. 362, Fulton	Eastern	15,346 70	19,085 05
Shanley-Morrissey, Inc.	Sept. 3, 1907	1) road, No. 363, Fulton	Eastern	10,480 40	11,193 85
Robert Shafer	July 12, 1906	low road, No. 364, Albany	Eastern	24,036 50	24,441 26
Shanley-Morrissey, Inc.	Sept. 3, 1907	No. 376, Fulton county	Eastern	23,582 40	23,588 24
Shanley-Morrissey, Inc.	Dec. 18, 1907	382, Orange county	Eastern	57,546 95	58,851 06
Robertson & Gerehart Contracting Co.	Sept. 3, 1907	Albany-Schenectady (section 2) road, No. 385, Albany county	Eastern	50,790 01	54,112 26
Stewart Kerbaugh-Shanley Co.	Sept. 20, 1907	Kitchawan-Croton Lake road, No. 405, Westchester county	Eastern	14,787 65	15,732 20
Malloy & Davis	Sept. 4, 1907	oad, No. 407, Schenec-	Eastern	34,225 77	35,640 72
Casey & Murray	July 10, 1906	No. 417, Warren county	Eastern	72,500 00	77,448 45
Casey & Murray	July 10, 1906	road, No. 418, Warren	Eastern	82,500 00	103,871 00
Lawler & Haines	Aug. 31, 1906	432, Dutchess county	Eastern	31,998 00	33,085 40
Buckley Construction Co	Sept. 1, 1906	orners road, No. 433,	Eastern	33,967 00	34,913 65
Jeremiah T. Finch	Sept. 1, 1906	No. 436, Nassau county	Eastern	56,000 00	82,038 96
Russell Contracting Co	Sept. 4, 1907	road, No. 437, Nassau	Eastern	70,357 02	74,592 64
Shanley-Morrissey, Inc.	Sept. 20, 1907	439, Rensselaer county	Eastern	37,950 49	39,146 07
Clinton Beckwith Engineering and Contracting Co.	Aug. 31, 1906	d 5) road, No. 441,	Eastern	59,987 00	62,390 33
Stewart Kerbaugh-Shanley Co.	Sept. 20, 1907	lens Falls road, No	Eastern	55,194 96	51,988 77
McNamee & Rice	July 10, 1906	No. 453, Dutchess county	Eastern	38,000 00	42,923 60
Ulysses G. Stockwell and Joseph Walker	July 9, 1906	Little Falls-East Creek road, No. 456, Herkimer county	Eastern	48,949 00 31,263 00	30,307 08
Sylvester A. Seymour	July 9, 1906	Little Falls-Herkimer road, No. 457, Herkimer county	Eastern	55,950 00	59,400 25
John H. Nelson & Co	July 10, 1906	Herkimer-Frankfort road, No. 458, Herkimer county	Eastern	31,367 00	33,293 63
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	ty	Eastern	56,000 00	56,201 90
John H. Nelson & Co	July 10, 1906	y.	Eastern	62,325 93	82,504 61
Newport Construction Co	Oct. 27, 1907		Eastern	71,255 59	67,395 81
Clinton Beckwith Engineering and Contracting Co	Aug. 31, 1906	Ausable Forks-Clintonville road, No. 476, Clinton county	Eastern	44,649 00	52,279 75
Rockefeller Brothers	Nov. 18, 1907	Valley Falls road, No. 477, Rensselaer county	Eastern	43,370 90	48,929 46
P. A. Lillis	Nov. 26, 1907	Haynerville Raymertown road, No. 478, Rensselaer county	Eastern	25,370 58	26,958 23

TABLE OF CONTRACTS COMPLETED DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908. — (Continued).

Improvement of Public Highways — (*Continued*).

CONTRACTOR.	Date of contract.	Final payments.
P A. Lillis	Nov. 26, 1907	$24,424 66
Molloy & Murray	Oct. 16, 1907	85,852 35
Elmore & Hamilton Contracting Co.	Sept 5, 1907	35,324 35
Shanley Morrissey, Inc.	Sept. 20, 1907	38,402 95
Shanley Morrissey, Inc.	Sept. 20, 1907	33,062 94
Jeremiah T. Finch	Sept. 19, 1907	54,111 94
General Construction Co	July 7, 1906	38,238 11
John W. Polcaro	July 6, 1906	21,319 44
Jeremiah T. Finch.	Sept 5, 1907	36 558 56
Twombly & Eldert	Jan 27, 1908	52,552 21
John E. Consalus	Sept. 20, 1907	51,430 30
Morris Kantrowitz	Nov. 21, 1907	62,259 75
Lane Construction Co.	Sept. 5, 1907	39,700 95
Samuel Beskin	Dec. 3, 1907	41,524 32
Joseph Walker	July 11, 1906	46,899 35
William F. McCabe	Nov. 26, 1907	39,924 03
Harry S Williams	Sept 1, 1906	25,482 70
County of Rockland	Sept. 13, 1906	144,167 28
General Construction Co	Dec. 3, 1907	14,213 67
John E. Consalus	Nov. 27, 1907	58,721 30
Hinman & Sproul	Sept 5, 1907	54,796 56
Malloy & Davis	Sept. 18, 1907	30,582 35
Malloy & Davis	Jan. 29, 1908	35,511 04
Shanley-Morrissey, Inc.	Dec. 18, 1907	13,676 76
Jeremiah T. Finch	Dec. 4, 1907	55,929 98
Reardon & Byrne.	Sept. 5, 1907	19,476 34
William F. McCabe	Nov. 26, 1907	71,017 61
John F. Creeden	May 21, 1908	41,150 54

J. K. Palmer & Co	Nov. 27, 1907	o. 678, Otsego county	Eastern	17,038 40	17,665 93
S. B. Van Wagenen	Dec. 4, 1907	678, Otsego county.	Eastern	24,577 01	24,811 99
Bellew & Merritt Co.	Jan. 30, 1908	road, No. 689, Rockland	Eastern	32,831 00	34,842 65
C. H. Flanigan	Jan. 29, 1908	lo 691, Warren county	Eastern	46,324 00	52,337 11
P. F. Herlihy	Jan. 30, 1908	s road, No. 692, Warren	Eastern	76,102 00	85,547 03
Bellew & Merritt Co.	Jan. 30, 1908	693, Suffolk county	Eastern	29,502 50	33,970 60
Robertson-Gerehart Contracting Co.	Jan. 28, 1908	94, Suffolk county	Eastern	66,292 90	73,886 52
John F. Clancy	Feb. 11, 1908	1) road, No. 699, Sullivan	Eastern	[illegible],022 50	63,119 96
l w & Merritt Co.	Jan. 30, 1908	2) road, No. 700, Sullivan	Eastern	44,939 00	43,132 25
Buckley Construction Co	Feb. 4, 1908	Franklin county	Eastern	34,326 40	40,843 23
Spuyten Duyvil Construction Co	Jan. 27, 1908	ion 3) road, No. 703	Eastern	32,069 00	35,252 86
Linehan & Burnham	Feb 5, 1908	No. 720, Washington	Eastern	35,350 00	46,337 30
Edward S. Brower	Jan. 29, 1908	White Creek-County Line road, No. 721, Washington county	Eastern	24,455 25	25,607 04
inman & Sproul	Feb. 3, 1908	Hebron Town Line-Granville road, No. 722, Washington	Eastern	18,327 75	19,442 92
Bellew & Merritt Co	Jan 30, 1908	y	Eastern	38,081 00	40,537 05
Buckley Construction Co	May 18, 1908	y	Eastern	28,757 00	26,729 75
S. B. Van Wagenen	Sept. 30, 1908		Eastern	9,002 00	8,865 00
Robertson-Gerehart Contracting Co.	Sept. 22, 1908		Eastern	4,001 61	4,343 90
Robertson-Gerehart Contracting Co	Sept. 22, 1908		Eastern	6,483 26	6,547 67
Celestin C. Burns	July 7, 1906	on 2)	Middle	13,962 00	17,986 40
Celestin C. Burns	July 7, 1906	y	Middle	27,858 00	33,652 52
Casey & Murray	July 10, 1906	Oneida	Middle	133,050 00	146,707 70
County of Broome	July 12, 1906		Middle	26,474 70	26,678 30
Hinman & Sproul	July 12, 1906		Middle	13,319 00	13,341 55
County of Broome	July 12, 1906		Middle	54,662 70	55,109 27
County of Broome	July 12, 1906	nty.	Middle	14,406 28	14,175 84
Barnett Contracting Co.	Sept. 18, 1906		Middle	12,700 00	16,135 95
Wm J Dwyer	Aug 31, 1906	nty	Middle	12,200 00	12,127 22
Stewart-Kerbaugh-Shanley Co.	Oct. 18, 1907		Middle	10,934 45	10,111 63
Casey & Murray	July 10, 1906	nty	Middle	26,750 00	31,043 81
Casey & Murray.	July 10, 1906	nty.	Middle	43,250 00	52,078 64
Wm. J Dwyer	Aug. 31, 1906	y	Middle	17,300 00	18,846 35
Charles H Quereau	Nov. 23, 1906		Middle	30,250 00	30,972 03
John H Gordon	Aug. 29, 1906	unty.	Middle	28,000 00	28,458 57
County of Broome	July 12, 1906		Middle	6,290 50	6,367 43
Brayer Brothers	July 10, 1906		Middle	18,000 00	19,224 08
Allyn G Bridge	Nov. 27, 1906	nty	Middle	34,759 75	35,930 48

TABLE OF CONTRACTS COMPLETED DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908 — (Concluded).

Improvement of Public Highways — (Concluded).

CONTRACTOR.	Date of contract.	Character of work.	Division.	Contract price.	Final payments.
Frederick Williams	Nov. 16, 1906	Belleville-Adams (section 1) road, No. 424, Jefferson county	Middle	$11,000 00	$11,011 31
Wm. J Semper	July 3, 1906	Adams-Watertown (section 2) road, No 425, Jefferson county	Middle	24,000 00	23,701 70
Wm. J. Dwyer	July 9, 1906	Thompson road, No. 429, Onondaga county	Middle	22,700 00	21,929 97
County of Tompkins	Aug. 30, 1906		Middle	33,238 75	33,216 18
Daniel V Brown	Nov. 10, 1906		Middle	37,769 00	40,969 88
Wm. I. Tyler	July 6, 1906				
—			Middle	19,000 00	18,727 49
	July 6, 1906		Middle	44,700 00	44,853 81
	Dec. 4, 1907		Middle	16,782 70	15,821 63
	July 11, 1906		Western	18,000 00	20,285 75
	July 13, 1906		Western	23,600 00	25,880 78
	July 18, 1906		Western	39,950 00	39,486 95
	July 10, 1906		Western	6,500 00	6,532 51
	July 11, 1906		Western	26,000 00	26,970 78
	July 7, 1906		Western	93,012 00	93,807 99
	Aug. 31, 1906				
			Western	17,531 00	20,159 91
Chambers & Grady	July 9, 1906		Western	22,700 00	23,328 73
Henry C. Schroeder	Sept. 24, 1907				
			Western	6,684 78	7,849 10
Whitmore, Rauber & Vicinus	Dec. 3, 1907		Western	27,170 88	28,521 19
A. J. Rockwood	Nov. 26, 1907		Western	23,790 30	24,666 50
Good Roads Construction Company	Sept. 8, 1906				
			Western	23,500 00	28,848 45
A. J. Rockwood	Nov. 26, 1907		Western	3,376 25	3,427 23
Baldwin Contracting Company	July 9, 1906		Western	38,699 00	39,981 73
Frederick W. Knickenberg	June 30, 1906		Western	37,960 00	42,550 15

Maintenance and Repairs of Improved Public Highways.

Chapter 468, Laws of 1906; Chapter 686, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of work.	Division.	Contract price	Final payment.
County of Broome	July 26, 1906	Repair contract No. 6—Roads Nos. 125 and 127, Broome county	Middle	$4,794 50	$5,272 10
Joseph H. Conners	July 17, 1907	Repair contract No. 22 — Roads Nos. 3 and 71, Oneida	Middle	8,162 50	8,167 50
Joseph H. Conners	July 17, 1907	No. 23 - Road No. 147, Jefferson	Middle	3,637 50	3,701 17
Douglas V Ash'ey	July 19, 1907	No 24 — Road No. 224, Chenango	Middle	6,932 50	6,905 42
Joseph H. Conners	July 17, 1907	No. 25 — Roads Nos. 49 and 121, nty	Middle	10,825 00	10,835 85

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1908.

CONTRACTOR.	Date of contract.	Character of work.	Division.	Act. Chap.	Act. Year.	Appropriation.	Engineer's preliminary estimate.	Contract price.	Payments to Sept. 30, 1908.
National Construction Co.	Nov. 1, 1906	Constructing stairways for the lift bridge at Catharine street, Syracuse	Middle	683	1906	$1,500 00	$1,065 50	$1,500 00	$675 00
John M. Shultz	Jan. 15, 1907	Constructing a lift bridge over the Oswego canal at North Salina street, Syracuse	Middle	668	1906	*75,000 00	62,621 00	65,686 00	60,228 00
John Young and Patrick J. Cawley	July 8, 1908	Constructing a protection wall on the west side of Skaneateles lake outlet	Middle	675 400 394	1906 1907 1908	15,000 00	9,122 00	11,893 00	....

* $31,250 appropriated by city of Syracuse and $12,500 by Syracuse Rapid Transit Railway.

Construction of Barge Canal.

Chapter 147, Laws of 1903, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work.	Division.	Engineer's preliminary estimate.	Contract price as affected by alterations.	Payments to Sept. 30, 1908.
Empire Engineering Corporation	April 18, 1905	Contract No. 1, Champlain canal — Hudson river, Northumberland to Fort Miller and Crocker's Reef to Fort Edward	Eastern	$619,846 00	$607,421 82	$390,951 00
Ferguson Contracting Company	April 3, 1905	Contract No. 2, Erie canal — Through Waterford to Contract No. 11	Eastern	1,022,640 00	906,896 26	559,215 00
Sundstrom & Stratton	April 4, 1905	Contract No. 3, Champlain canal — Fort Miller to Crocker's Reef	Eastern	760,576 00	657,273 09	511,011 00
Groton Bridge Company	Aug. 10, 1906	Contract No. 7. Erie and Champlain canals — Bridges on Contracts Nos. 2, 3, 4, 5 and 6	Eastern Middle Western	102,122 70	101,929 95	58,392 00

Pittsburg-Eastern Company	May 22, 1906	Contract No. 8, Erie canal — Dams and locks at Scotia, Rotterdam and Cranesville	Eastern	1,318,382 00	1,451,702 90	310,401 00
Fort Orange Construction Company	May 21, 1906	Contract No. 11, Erie canal — From Contract No. 2 to Mohawk river	Eastern	1,671,385 00	1,343,165 00	407,043 00
Acme Engineering and Contracting Company	Sept. 10, 1907	Contract [illegible] r, Crescent to Rexford [illegible] and Mindenville, d [illegible] Canajoharie. Yosts a [illegible]	Eastern	2,675,570 00	2,947,838 00	334,413 00
Atlantic, Gulf & Pacific Company	Aug. 9, 1906	Contract [illegible] ll to Comstock	Eastern	1,380,760 00	1,523,819 75	621,306 00
United Construction Company	Dec. 20, 1906	Contract [illegible] — Bridges on Contrac [illegible]	Eastern	70,719 00	69,078 95	..
[illegible]	Dec. 29, 1906 Mar 3, 1906	Contract [illegible] ks at Amsterdam an [illegible]	Eastern	883,926 00 836,221 00	836,781 78 806,455 20	48,744 00 114,750 00
[illegible] Company	Dec. 28, 1906	Contract No. 18, Erie canal — Mindenville to Castle creek	Eastern	785,980 00	855,001 90	260,028 00
[illegible] Company	Nov. 19, 1906	Contract No. 25, Champlain canal — Comstock to Dunhams Basin	Eastern	1,849,831 00	1,717,649 50	366,813 00
Lake Erie Dredging Company	April 6, 1906	Contract No 26, Champlain canal — Hudson river, near Fort Edward	Eastern	60,225 00	59,795 00	3,285 00
Kinser Construction Company	Nov. 23, 1906	Contract No. 27, Champlain canal — Dunhams Basin to Fort Edward	Eastern	998,920 00	968,296 11	227,835 00
Casey & Murray	Sept 2, 1906	Contract No. 31, Erie canal — Through Little Falls; Rocky Rift dam	Eastern	813,800 00	829,770 43	....
M. Fitzgerald	Aug. 8, 1906	Contract No. 34, Erie canal — Highway bridge at Saratoga avenue, Waterford	Eastern	22,604 00	22,449 00	18,468 00
Empire Engineering Corporation	April 18, 1905	Contract No 4, Erie canal — The 4½ miles east of Oneida lake	Middle	812,560 00	729,567 75	60,252 00
Empire Engineering Corporation	April 18, 1905	Contract No. 5, Erie canal — Mosquito Point to Fox Ridge	Middle	421,252 50	375,871 57	113,238 00
Mosier & Summers	June 7, 1906	Contract No. 10, [illegible]	Middle	1,149,968 00	1,107,610 32	176,706 00
Stewart Kerbaugh Shaney Company	Sept. 23, 1907	Contract No. 12 [illegible]	Middle	3,082,560 00	3,391,833 66	234,036 00
Gilmour Horton Allen Company	Sept. 16, 1907	Contract No. 35, [illegible]	Middle	752,760 00	745,967 90	43,128 00
Scott Brothers	May 6, 1908	Contract No. 45, Erie canal — Through Baldwinsville, Caughdenoy dam	Middle	425,124 00	467,513 50	42,741 00
F. A. Maselli & Co.	May 3, 1905	Contract No. 6, Erie canal — Buffalo road, southwest of Rochester, to near South Greece	Western	1,391,662 50	1,024,256 80	594,324 00
Thomas Crimmins Contracting Company	Mar 18, 1908	Contract No 9, Erie canal — Eagle Harbor to Beal's bridge	Western	724,014 00	755,995 00	56,331 00
Great Lakes Construction Company	Nov 26, 1906	Contract No 19, Erie canal — Sulphur Springs guard-lock to Ellicott creek	Western	1,038,245 00	892,991 16	117,315 00
Empire Engineering Corporation	Aug. 6, 1908	Contract No. 60, Erie canal — Near South Greece to near Adams Basin bridge	Western	1,267,301 00	1,349,084 00	5,922 00
Empire Engineering Corporation	Aug. 6, 1906	Contract No. 64, Erie canal — Near Prospect street bridge, Medina, to near Gasport bridge	Western	1,207,930 00	1,290,492 00	....
Empire Engineering Corporation	Sept. 22, 1908	Contract No. 66, Erie canal — Near Gasport bridge to near locks at Lockport	Western	751,039 00	750,685 50	....

* Contract re'e:

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1908 — (Continued).

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws

CONTRACTOR.	Date of contract	Character of work.	Division.	Engineer's preliminary estimate.	Contract price	Payments to Sept. 30, 1908.
Mansfield & Burton	Jan. 20, 1908	Craigsdale Under-grade Crossing road, No. 154-B, Orange	Eastern	$15,592 00	$15,086 00	......
Robert Shafer	July 12, 1906		Eastern	33 900 00	24,443 40	$14,811 80
Shanley Morrissey, Inc	Sept 30, 1907		Eastern	59,600 00	55,809 45	20,075 65
Shanley Morrissey, Inc	Dec. 18, 1907					
Elmore & Hamilton Contracting Company	Dec 2, 1907		Eastern	41,900 00	38,610 70	17,932 05
[illegible]	Sept 19, 1907		Eastern	225,000 00	187,635 00	1 525 90
[illegible] Constructing Company	Dec 2, 1907		Eastern	45,700 00	37 611 50	19,204 70
Shanley Morrissey, Inc	Jan 30, 1908		Eastern	126,410 00	70 660 30	22,194 90
James F. Martin	July 5, 1906		Eastern	61,700 00	49,773 15	7,744 35
Shanley Morrissey, Inc	Sept 20, 1907		Eastern	66 450 00	52,496 00	55,845 04
J. K. [illegible] & Company	Nov 27, 1907		Eastern	69 842 11	51 925 50	35 088 06
J. K. [illegible] & Company	Nov 27, 1907		Eastern	77 927 30	70 050 38	36 502 85
Delaware Construction Company	Feb. 4, 1908		Eastern	52,800 00	43,179 31	12,058 31
[illegible] Company	Jan 27, 1908		Eastern	43,900 00	42,815 39	17 120 85
[illegible]	Feb. 11, 1908		Eastern	53,900 00	43,229 00	8,935 20
[illegible]	May 18, 1908		Eastern	55,100 00	37,894 90	21,157 80
[illegible]	May 18, 1908		Eastern	60,200 00	43,660 95	1,465 25
[illegible]	Dec 31, 1906		Eastern	91,400 00	61,044 00	29,209 50
[illegible]	July 7, [illegible]		Middle	8,600 00	7,545 00	6,518 88
[illegible]	Sept 20, 1907		Middle	49,950 00	45,176 00	50,147 32
Stewart Kerbaugh-Shanley Co.	Sept 20, 1907		Middle	38,200 00	35,467 20	16,177 29
Casey & Murray	Sept 15, 1906		Middle	15 600 00	14,716 45	11,894 46
Chambers & Grady	Dec 4, 1907		Middle	86,500 00	79,800 00	82,887 05
Hinman & Sproul	July 12, 1906		Middle	17,850 00	15,896 50	13,316 25
Stewart Kerbaugh Shanley Co	Sept 20, 1907		Middle	31,500 00	30,604 00	26,717 30
Stewart Kerbaugh Shanley Co	Sept 20, 1907		Middle	26,950 00	23,475 90	17,825 58
C. H. Quereau Co., Inc	July 10, 1906		Middle	27,800 00	25,423 35	21,485 25
C. H. Quereau Co., Inc	July 10, 1906		Middle	10,550 00	9,350 00	6,466 10
Henry C. Schroeder	Sept 18, 1907		Middle	9,800 00	8,750 00	8,074 53
			Middle	50,500 00	45,743 15	21,930 24

Stewart Kerbaugh-Shanley Co	Sept. 20, 1907	ad, No. 330,	Middle	28,500 00	27,093 00	19,864 44
County of Tompkins	Aug. 30, 1906	ty	Middle	37,400 00	33,162 00	26,651 70
Stewart-Kerbaugh-Shanley Co	Sept. 20, 1907	ty	Middle	13,800 00	12,525 20	4,953 89
County of Tompkins	Aug. 30, 1906	pkins county	Middle	14,900 00	13,111 00	11,833 78
Wm. I. Tyler	Sept. 18, 1906		Middle	31,400 00	27,487 50	23,007 05
Wm. J. Dwyer	July 9, 1906		Middle	20,400 00	18,000 00	17,834 41
John H. Gordon	Nov. 23, 1906	y	Middle	36,000 00	34,500 00	30,739 50
Hinman & Sproul	July 12, 1906		Middle	33,550 00	32,902 60	29,020 09
John Weber & Sons, Inc	July 10, 1906		Middle	30,750 00	26,661 00	22,819 27
John Weber & Sons, Inc	Sept. 19, 1906		Middle	7,600 00	6,868 00	5,686 70
Mott & Kemper	Nov. 14, 1906		Middle	42,400 00	37,300 00	32,962 50
Stewart Kerbaugh-Shanley Co	Sept. 20, 1907		Middle	27,300 00	28,475 75	
The Scofield Co	Nov. 10, 1906		Middle	31,960 00	28,250 00	25,103 26
Hinman & Sproul	July 12, 1906		Middle	35,600 00	35,287 18	12,703 39
Casey & Murray	Dec. 2, 1907		Middle	84,100 00	80,191 25	64,678 86
Stewart Kerbaugh-Shanley Co	Sept. 20, 1907	23, Jefferson	Middle	40,350 00	39,419 85	1,693 12
Wm. J. Semper	Mar. 23, 1908	y	Middle	46,950 00	45,330 50	34,145 64
Stewart Kerbaugh Shanley Co	Dec. 18, 1907	Watertown Carthage (section 3) road, No. 428, Jefferson county	Middle	34,400 00	32,047 55	21,545 69
J. Charles Dayton	July 20, 1906	road, No. 431, Onondaga county	Middle	27,700 00	25,997 00	22,695 36
M. F. Dollard	Aug. 29, 1906	and Spencer sections), No. 438, Oneida county	Middle	70,500 00	66,666 00	66,268 16
Joseph McCormack	Dec. 20, 1907	Lisle-Center Lisle road, No. 445, Broome county	Middle	35,250 00	31,362 45	25,420 57
Stewart Kerbaugh Shanley Co	Sept. 20, 1907	Phoenix-Pennellville road, No. 450, Oswego county	Middle	21,550 00	18,787 50	
Stewart Kerbaugh Shanley Co	Jan. 14, 1908		Middle	24,300 00	21,561 50	
Wm. J. Dwyer	July 9, 1906		Middle	33,100 00	28,937 95	7,139 92
County of Tompkins	Aug. 30, 1906		Middle	4,500 00	3,851 25	1,178 49
County of Tompkins	Aug. 30, 1906	s county	Middle	44,400 00	35,656 25	17,281 47
John Young	Nov. 10, 1906	No. 486,	Middle	37,000 00	31,994 00	28,007 79
Daniel V. Brown	Nov. 10, 1906		Middle	44,300 00	36,487 00	25,829 88
Stewart Kerbaugh-Shanley Co	Oct. 18, 1907		Middle	17,600 00	17,633 90	10,605 02
John Weber & Sons, Inc	July 10, 1906	unty..	Middle	29,366 00	25,770 00	21,337 56
Stewart Kerbaugh Shanley Co	Sept. 20, 1907	No. 521,	Middle	61,800 00	59,660 00	37,527 86
Stewart Kerbaugh Shanley Co	Sept. 20, 1907	d county	Middle	21,750 00	20,019 60	9,236 47
Casey & Murphy	Sept. 19, 1907		Middle	103,000 00	84,653 00	71,601 23
Casey & Murphy	Sept. 19, 1907		Middle	24,600 00	23,406 70	19,580 42
Brown & Lowe	Jan. 29, 1908	a county	Middle	57,400 00	51,272 67	43,578 40
Brown & Lowe	Jan. 29, 1908	a county	Middle	41,400 00	37,685 38	1,323 54
Hyde, Hyde & Foley	Mar. 4, 1908		Middle	60,350 00	49,660 42	20,300 06
The Scofield Co	Nov. 10, 1906	Auburn-Seneca Falls (section 1) road, No. 590, Cayuga county	Middle	76,900 00	69,660 00	67,087 08
Jeremiah T. Finch	Nov. 15, 1906	Moravia-Niles road, No. 591, Cayuga county	Middle	89,800 00	82,392 00	66,899 81
Chambers & Grady	Sept. 18, 1906	Auburn-Elbridge road, No. 592, Cayuga county	Middle	55,400 00	47,000 00	41,966 15

TABLE OF CONTRACTS PENDING SEPTEMBER 30, 1908 — (Concluded).

Improvement of Public Highways — (Concluded).

CONTRACTOR.	Date of contract	Character of work.	Division.	Engineer's preliminary estimate	Contract price.	Payments to Sept. 30, 1908.
Chambers & Grady	Dec 4, 1907	Homer Tully (section 2) road, No. 595, Cortland county	Middle.	$45,650 00	$43,327 45	$18,758 97
Stewart Kerbaugh Shanley Co	Sept 20, 1907	Norwich South New Berlin (section 1) road, No. 596, Chenango county	Middle	25,900 00	32,988 50	23,674 86
Newport Construction Co	Oct 22, 1907	Norwich Kings Settlement road, No. 597 Chenango county	Middle	36,550 00	33,127 15	28,772 12
Stewart Kerbaugh Shanley Co	Dec 14 1907	Norwich Preston road No. 598, Chenango county	Middle	59,700 00	52,664 60	31,543 38
Delaware Construction Co	Feb 4 1908	Smyrna Otselic road No. 599, Chenango county	Middle	62,400 00	60,169 90	18,691 34
Stewart Kerbaugh Shanley Co	Sept 20, 1907	Cayuga Heights Hanshaw's Corners road, No. 606, Tompkins county	Middle	25,000 00	21,511 75	15 992 77
Stewart Kerbaugh Shanley Co	Sept 20, 1907	Auburn Owasco road No. 614, Cayuga county	Middle	59,000 00	54,662 15	27,475 79
Stewart Kerbaugh Shanley Co	Sept 20, 1907	Trumansburg Ithaca road, No. 616, Tompkins county	Middle	94,500 00	88 439 60	65 093 62
Stewart Kerbaugh Shanley Co	Dec 18, 1907	Granby road No. 653 Oswego county	Middle	63,200 00	57,586 00	33,077 02
Stewart Kerbaugh Shanley Co	Dec 18, 1907	Cato Meridian Baldwinsville road, No. 684, Cayuga county	Middle	59,400 00	55,752 65	34,312 01
Stewart Kerbaugh Shanley Co	Feb 11, 1908	Chittenango Oneida (section 2) road, No. 726, Madison county	Middle	89,250 00	77,721 10	47,257 02
Ryan & Yale	April 23, 1908	Ogdensburg Canton (section 1) road, No. 732, St Lawrence county	Middle	75,550 00	64,472 50	25,857 50
Ryan & Yale	April 23, 1908	Ogdensburg Canton (section 2) road, No. 733, St Lawrence county	Middle	80,100 00	67,115 65	28,016 31
Frederick A. Brotsch	July 11 1906	Chili section 1 road No. 254, Monroe county	Western	27,700 00	19,400 00	23 445 05
Frederick A. Brotsch	July 11 1906		Western	26,000 00	16,070 00	12,441 52
Stewart Kerbaugh Shanley Co	Sept 20, 1907	286, Monroe	Western	40,300 00	36,392 40	19,118 63
Monroe Roads Company	Sept 17 1907	county	Western	44,900 00	40,475 34	33,770 43
Bennett & Ryan	Mar 9, 1908		Western	55,000 00	54,176 85	29,572 51
Casey & Murray	Dec 2 1907	unty	Western	80,600 00	77,954 40	58,645 75
Gantz Wilson Construction Co	July 18, 1906	unty	Western	55,900 00	45,925 00	137,950 65
Gantz Wilson Construction Co	July 18, 1906	unty	Western	61,500 00	52,995 00	81,568 81
Baldwin Contracting Co	July 9, 1906		Western	84,400 00	69,197 00	57,552 64
Thomas Hucknell	Aug. 31, 1906	Five Corners Kuckville (section 2) road, No. 387, Orleans county	Western	41,500 00	36,935 00	29,459 79
Frederick W. Knickenberg	Sept 27, 1907	road, No. 389, Orleans county	Western	21,600 00	17,974 10	9,073 80
Frederick W. Knickenberg	Sept 27, 1907	road, No. 390, Orleans county	Western	19,000 00	16,636 25	7,503 30
Greece Construction Co	Dec 4, 1907	No. 391, Orleans county	Western	31,600 00	25,136 00	18,767 25
Stewart-Kerbaugh-Shanley Co.	Dec 18, 1907	9, Orleans and Monroe counties	Western	37,500 00	30,342 10	
Jeremiah T. Finch	Sept 19, 1907	nroe county	Western	82,000 00	72,004 95	61,100 46
Greece Construction Co	Dec 4, 1907	, No. 402, Monroe county	Western	32,300 00	24,806 65	24,092 56

Rockefeller Bros	Nov. 26, 1907		Western	20,100 00	17,412 60	4,161 41
A. J. Rockwood	Nov. 26, 1907		Western	17,200 00	14,695 55	12,621 42
Henry P Burgard Co	Jan. 20, 1906	ounty	Western	32,900 00	30,000 00	25,488 50
Baldwin Contracting Co	July 9, 1906		Western	114,900 00	94,000 00	72,635 04
Mosier & Summers	Sept. 17, 1907		Western	73,900 00	64,585 65	54,343 19
Stewart Kerbaugh-Shanley Co	Sept. 20, 1907		Western	46,900 00	44,446 80	27,734 00
Stewart-Kerbaugh-Shanley Co	Sept. 20, 1907	ounty	Western	37,300 00	36,454 25	
Stewart Kerbaugh-Shanley Co	Sept. 20, 1907	nty	Western	87,500 00	72,915 00	
Stewart-Kerbaugh-Shanley Co	Sept. 20, 1907	nty	Western	66,500 00	61,257 75	12,031 65
Stewart Kerbaugh-Shanley Co	Sept. 20, 1907	Alden-Town line, Clinton street Marilla road, No. 529 Erie county	Western	49,000 00	45,596 90	26,752 27
Stewart Kerbaugh-Shanley Co	Sept. 20, 1907	Base Line-Grand Island (section 1) road, No. 530, Erie county	Western	14,000 00	13,077 55	10,835 60
Stewart-Kerbaugh-Shanley Co	Dec. 18, 1907	Base Line-Grand Island (section 2) road, No. 531, Erie county	Western	19,800 00	18,194 65	9,344 88
Stewart Kerbaugh Shanley Co	Dec. 18, 1907	Base Line-Grand Island (section 3) road, No. 532, Erie county	Western	11,400 00	10,425 35	8,545 50
Henry P. Burgard Co	May 7, 1908	Skinnersville New Home Bridge road, No. 584, Erie county	Western	87,700 00	76,010 70	54,887 30
Gantz Wilson Construction Co	Sept. 24, 1907	Olean-Allegany (sections 1 and 2) road, No. 601, Cattaraugus county	Western	39,000 00	35,963 29	8 616 22
Gantz Wilson Construction Co	Dec. 18, 1907		Western	26,600 00	26 503 25	13,249 80
Gantz-Wilson Construction Co	Dec. 18, 1907		Western	12,700 00	14,977 08	11,648 83
Stewart Kerbaugh Shanley Co	Sept 20, 1907		Western	35,000 00	32,330 35	23,627 48
Stewart-Kerbaugh Shanley Co	Sept 20, 1907		Western	49,200 00	46,197 30	
Stewart Kerbaugh Shanley Co	Dec. 18, 1907		Western	60,500 00	56,514 65	21,389 68
Stewart-Kerbaugh-Shanley Co	Dec. 18, 1907		Western	43,200 00	39,839 40	24,929 87
Stewart Kerbaugh Shanley Co	Dec 18, 1907		Western	72,400 00	65,268 95	13,594 05
Stewart Kerbaugh Shanley Co	Feb. 11, 1908		Western	12,600 00	11,794 00	7,756 66
Stewart-Kerbaugh-Shanley Co	Feb. 11, 1908		Western	41,300 00	33,901 60	1,557 40
Stewart Kerbaugh Shanley Co	Feb. 11, 1908	Otto-East Otto (section 2) road, No 697, Cattaraugus county	Western	20,500 00	17,362 90	10,419 52
E. M. Love & Son	Feb. 5, 1908	Falconer Kennedy road, No. 698, Chautauqua county	Western	11,500 00	9,845 70	4,663 01
Star Contracting Co	Jan. 30, 1908	Portville Olean (section 1) road, No. 730, Cattaraugus county	Western	39,900 00	35,104 15	......
Star Contracting Co	Jan 30, 1908	Portville Olean (section 2) road, No. 731, Cattaraugus county	Western	25,800 00	19,619 50	5,469 90
Bradley & Noan	Jan 30, 1908	Big Flats-Gibson road, No. 742, Steuben county	Western	56,200 00	48,185 43	42,440 03

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908.

EXPLANATORY NOTES. —"Same" means that the filler was screened from the crushed stone forming the course. Bl means bluestone, which is a tough sandstone. Li means limestone; gran means granite or granitic; quart, quartzite, san, sandstone; fld, fieldstone; gr, gravel; lo, local; qua, quarried; ro, rock; br, broken; st, stone; sam, same; sh, shale.

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Bottom. Kind of screenings or sand as filler.	Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Top. Kind of screenings or sand as filler.	Per cent completed.	TOTAL COST COMPLETED. Whole.	Per mile.
					Feet.	Feet.								
1	Troy and Schenectady	Schenectady	9, 7, '98	2.00	16	22	5,500	Limestone	Same	Trap-rock	Limestone	100	$16,517 51	$8,259
2	White's Corners-Hamburg	Erie	10, 4, '98	6.540	12	22	4,590	Limestone	Same	Limestone	Limestone	100	30,928 60	4,729
2a	White's Corners	Erie	8, 9, '00	6.540	20, 15	22	....	....	....	Trap-rock	Limestone	100	24,294 57	3,715
3	Deerfield	Oneida	10, 4, '98	2.25	12	18	5,000	Limestone	Same	Trap-rock	Limestone	100	16,338 24	7,261
4	New Lebanon-Pittsfield	Columbia	10, 25, '98	1.23	16	21	13,000	Gravel	None	Gravel	None	100	9,992 87	8,124
5	East Avenue	Monroe	3, 6, '99	2.45	12	22	8,160	Limestone	Same	Trap-rock	Limestone	100	13,898 70	5,673
6	Little Ridge, Sec. 1	Monroe	8, 16, '99	6.53	16	26	2,150	Lo fld san	Le Roy li	Trap-rock	T'k's C'v li	100	40,013 89	6,128
7	Delaware Turnpike, Sec. 1	Albany	5, 12, '00	1.04	15	22	16,827	Limestone	Same	Trap-rock	Limestone	100	23,672 80	....
7a	Delaware Turnpike, Sec. 1	Albany	3, 27, '03	1.04	15	22	....	....	....	Limestone	Same	100	7,881 53	7,578
7b	Delaware Turnpike, Sec. 1	Albany	4, 7, '03	1.04	15	22	....	....	....	Limestone	Same	....	....	....
8	Cortland Street	Onondaga	7, 6, '99 9, 21, '99	1.20	15	22	2,500	Li 6"	Same	Trap-rock	Limestone	100	12,889 56	10,741
9	James Street	Onondaga	9, 21, '99 7, 1, '99	0.58	15	22	3,300	Li 6"	Same	Trap-rock	Limestone	100	7,729 93	13,327
10	Troy and Brunswick, Sec. 1	Rensselaer	7, 21, '99	1.00	15	22, 25	4,300	Limestone	Same	Trap-rock	Limestone	100	7,437 26	7,437
11	Troy and Greenbush, Sec. 1	Rensselaer	7, 21, '99	1.03	15	22	8,738	Limestone	Same	Trap-rock	Cl't'n Pt. li	100	10,642 75	10,333
12	....	....	....	....	....	....	....	....	....	....	....	....	....	....
13	Southport, Sec. 1	Chemung	5, 16, '00	2.60	16	20	3,170	Lo qua san	Same	Trap-rock	Le Roy li	100	20,903 04	8,040
14	Frankfort and Utica	Herkimer	5, 8, '00	1.11	15	22	5,712	Gneiss	Limestone	Gneiss	Limestone	....	....	....
15	Hudson Avenue, Sec. 1	Monroe	5, 8, '00	0.637	16	22	7,100	Limestone	T'k's C'v. li	Trap-rock	T'k's C'v li	100	7,242 67	11,370
16	Ulster and Delaware, Sec. 1	Ulster	5, 14, '00	5.66	12	16	2,915	Lo "bl"	Same	Lo "bl"	Same	100	30,040 00	5,307
17	Hastings Ardsley	Westchester	5, 12, '00	0.60	16	22	4,750	Lo gran ro	T'k's C'v li	Trap-rock	T'k's C'v li	100	6,192 33	10,321
18	Ardsley-Elmsford	Westchester	5, 12, '00	3.06	16	22	3,791	Lo gran ro	T'k's C'v li	Trap-rock	T'k's C'v li	100	27,392 18	8,952
19	Mamaroneck-White Plains	Westchester	7, 23, '00	2.80	16	22	5,786	Lo gran ro	Limestone	Trap-rock	Limestone	100	28,014 56	10,005
20	White Plains-Armonk	Westchester	5, 12, '00	3.77	14	20	4,509	Lo gran ro	Limestone	Trap-rock	Limestone	100	31,520 00	8,361
21	Sauquoit Creek	Oneida	7, 6, '00	1.33	15	22	2,077	Limestone	Same	Trap-rock	Limestone	100	10,487 32	7,885
22	Loudon (N. from Albany)	Albany	6, 25, '00	3.41	16	22	2,933	Limestone	Cl't'n Pt. li	Trap-rock	Cl't'n Pt. li	100	35,507 96	10,413

23	River (N. from Buffalo)........	Erie........	7, 26, '00	1.458	20	26	5,750	Limestone...	Flint & li....	Trap-rock...	Flint & li....	100	17,356 04	11,904
24	....	....	....	....	....	....	....	....	....	....	....	....	....	....
25	Troy and Brunswick, Sec. 2....	Rensselaer...	7, 16, '01	3.05	15	22, 25	2,459	Lo quart..	Sandy loam and same..	Lo quart	Sandy loam and same..	100	28,820 00	9,449
26	Troy and Greenbush, Sec. 2....	Rensselaer...	6, 29, '01	2.59	16	22	5,405	Limestone...	Cl't'n Pt. li..	Trap-rock...	Sam & CPli..	100	22,658 49	8,748
27	Orchard Park, Sec. 1..........	Erie........	9, 27, '00	1.155	16	20	3,430	Limestone...	Same.......	Trap-rock...	Limestone...	100	14,619 30	12,657
28	Southport, Sec. 2.............	Chemung....	7, 17, '01	3.408	16	20	5,780	Lo qua san..	Same.......	Trap-rock...	Le Roy li....	100	36,482 25	10,704
29	Southport, Sec. 3.............	Chemung....	7, 17, '01	1.06	16	20	1,670	Lo qua san..	Same.......	Trap-rock...	Le Roy li....	100	11,987 82	11,309
30	South Broadway............	Chemung....	7, 17, '01	1.021	16	20	1,600	Lo qua san..	Same.......	Trap-rock...	Le Roy li....	100	10,799 39	10,577
31	Ulster and Delaware, Sec. 3....	Ulster.......	6, 10, '01	5.72	12, 16	16, 22	3,234	Lo "bl"....	Same.......	Lo "bl"....	Same.......	100	41,728 00	7,295
32	Amsterdam-Minaville..........	Montg'mery..	6, 5, '01	2.65	12	22	5,660	Fieldstone...	Same.......	N ½, li.... S ½, fld....	Limestone. Limestone.	100	17,510 00	6,608
33	Gloversville-Mayfield..........	Fulton......	6, 5, '01	4.04	16	22	4,827	Lo gran ro...	½ same, ½ li..	Lo gran ro...	½ sam, ½ li...	100	30,952 00	14,330
34	Ardsley-Elmsford, Sec. 2.......	Westchester..	5, 31, '01	2.16	16	22	6,667	Lo gran ro...	Same.......	Trap-rock...	Limestone...	100	20,954 20	9,701
35	White Plains-Armonk, Sec. 2...	Westchester.	7, 22, '01	3.21	14	20	3,302	Lo gran ro...	Same.......	Lo gran ro...	Same & li...	100	26,000 00	8,100
36	Griffin's Corners.............	Delaware....	6, 18, '01	1.57	12	16	5,238	Lo "bl"....	Same.......	Lo "bl"....	Same.......	100	13,116 55	8,354
37	Saugerties-Woodstock, Sec. 1...	Ulster.......	6, 10, '01	4.00	12	16, 18, 20, 22	3,125	Lo "bl"....	Same.......	Lo "bl"....	Same.......	100	22,881 18	5,720
38	Saugerites-Woodstock, Sec. 2...	Ulster.......	5, 6, '02	4.90	12	16-24	3,367	Lo "bl"....	Sand........	Lo "bl'....	Same.......	100	35,520 00	7,249
39	Waterford-Mechanicville, Sec. 1.	Saratoga....	7, 27, '01	1.51	16	22	2,119	Limestone...	Same.......	Trap-rock...	Limestone...	100	12,370 00	8,192
40	Cuyler (at Truxton)	Cortland....	7, 16, '01	0.47	16	26	2,340	Limestone...	Same.......	Limestone...	Same.......	100	3,420 00	7,277
41	Delaware Turnpike, Sec. 2......	Albany......	6, 5, '01	2.74	15	22	5,109	Limestone...	Same.......	Limestone...	Same.......	100	22,497 20	8,211
42	Newburgh-Woodbury.........	Orange......	6, 18, '01	11.00	....	16, 22	Emb. 3,455	Gravel......	None.......	Gravel......	None.......	100	22,330 00	2,030
43	Cochecton Turnpike...........	Orange......	6, 18, '01	7.55	....	22	4,848	Local shale..	None.......	Local shale..	None.......	100	22,928 00	3,037
44	Goshen-Florida..............	Orange......	6, 18, '01	4.22	....	22	Emb. 4,502	Gravel......	None.......	Gravel......	None.......	100	9,690 00	2,296
45	Middletown-Pine Bush........	Orange......	6, 18, '01	9.25	....	16	2,811	Gravel......	None.......	Gravel......	None.......	100	13,770 00	1,489
46	Turners-Monroe.............	Orange......	6, 18, '01	1.59	....	22	3,333	Gravel......	None.......	Gravel......	None.......	100	8,315 02	5,230
47	Chenango River.............	Broome.....	8, 12, '01	1.75	16	22	4,160	Fieldstone...	Same.......	Limestone...	Same.......	100	15,980 00	9,131
48	West Lake Road............	Onondaga...	11, 29, '01	1.00	16	24	5,000	Fieldstone...	Sand.......	Limestone...	Same.......	100	9,100 00	9,100
49	Fabius-Apulia, Sec. 1.........	Onondaga...	5, 17, '02	2.00	16	22	2,309	Fld and li...	Sand.......	Limestone...	Same.......	100	18,600 00	9,300
50	Armonk-Mt. Kisco...........	Westchester..	7, 22, '01	4.44	12	20	5,315	Lo gran ro...	Same.......	Lo gran ro...	Same & li...	100	38,103 08	8,582
51	Mt. Kisco-Bedford...........	Westchester..	7, 24, '01	5.04	12	20	5,615	Lo gran ro...	Sand.......	Lo gran ro...	Same.......	100	44,084 00	8,746
52	Unionville-McKeels Corners....	Westchester..	5, 31, '01	3.69	12	20	5,095	Lo gran ro...	Sand.......	Lo gran ro...	Same.......	100	31,411 00	8,512
53	McKeels Corners-Briar Cliff....	Westchester..	5, 31, '01	1.76	12	20	5,284	Lo gran ro...	Sand.......	Lo gran ro...	Same.......	100	13,967 96	7,936
54	Briar Cliff-Echo Lake........	Westchester..	7, 17, '01	2.65	12	20	6,792	Lo gran ro...	Same.......	Lo gran ro...	Li & same...	100	22,540 00	8,505
55	Hoag's Corners.............	Rensselaer...	7, 16, '01	3.15	....	16	5,238	Earth.......	None.......	Earth & gr..	None.......	100	10,684 00	3,392
56	Plattsburg-Keeseville, Sec. 1...	Clinton......	6, 7, '01	2.82	16	22	3,121	Limestone...	Same.......	Limestone...	Same.......	100	18,910 00	6,706
57	Windsor, Sec. 1..............	Clinton......	6, 7, '01	1.00	16	22	2,800	Limestone...	Same.......	Limestone...	Same.......	100	7,780 00	7,780
58	Glens Falls-Saratoga..........	Saratoga....	6, 4, '01	6.06	12	16, 22	3,845	Lo gran ro...	Same.......	Lo gran ro...	Same & sand.	100	34,610 00	5,711
59	Waterford Mechanicville, Sec. 2.	Saratoga....	7, 27, '01	5.03	16	22, 28	2,425	Limestone...	Same.......	Trap-rock...	Limestone...	100	40,532 00	8,058
60	Fairport..................	Monroe......	7, 15, '01	3.039	16	20, 22	6,580	Limestone...	Same.......	Trap-rock...	Limestone...	100	35,376 84	11,640
61	Pittsford..................	Monroe......	7, 15, '01	1.304	16	22	5,840	Limestone...	Same.......	Trap-rock...	Limestone...	100	14,852 47	11,389
62	West Henrietta..............	Monroe......	6, 28, '02	6.237	16	22	3,447	Limestone...	Sand.......	Limestone...	Same.......	100	55,000 00	8,818
63	Scottsville, Sec. 1............	Monroe......	7, 2, 02	2.254	16	22	2,040	Limestone...	Sand.......	Limestone...	Same.......	100	19,700 00	8,740

Note.— Numbers 12 and 24 were canceled.

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Bottom. Kind of screenings or sand as filler.	Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Top. Kind of screenings or sand as filler.	Per cent completed.	TOTAL COST COMPLETED. Whole.	Per mile.
					Feet.	Feet.								
64	Walden Scott's Corners	Orange	6, 20, '02	1.840	.....	16	2,554	Gravel	None	Gravel	None	100	$4,868 00	$2,646
65	Montgomery-Goshen	Orange	6, 20, '02	7.950	.....	22	4,302	Gr & br st	Same	Gr & br st	Same	100	35,712 20	4,492
66	Orchard Park, Sec. 2	Erie	6, 11, '02	0.952	16	20	5,013	Limestone	Same	Limestone	Same	100	11,600 00	12,185
67	Orchard Park, Sec. 3	Erie	6, 11, '02	3.410	16	20	4,200	Limestone	Same	Limestone	Same	100	34,900 00	10,234
68	Orchard Park, Sec. 4	Erie	6, 11, '02	1.170	16	20	3,513	Limestone	Same	Limestone	Same	100	12,728 00	10,879
69	Main Street, Sec. 1	Erie	5, 9, '02	3.415	16	22	1,252	Limestone	Same	Limestone	Same	100	28,000 00	8,167
70														
71	Utica-Paris	Oneida	5, 6, '02	5.200	16	24	4,231	Limestone	Same	Trap-rock	Limestone	100	47,200 00	9,077
72	Catskill Turnpike, Sec. 1	Tompkins	6, 9, '03	1.869	16	28	3,210	Fieldstone	Sand & same	Limestone	Same	100	18,000 00	9,631
73	Quaker Street, Sec. 1	Schenectady	5, 17, '02	1.180	12-16	18-22	13,982	Limestone	Same	Limestone	Same	100	15,993 00	13,553
74	Marcellus	Onondaga	6, 18, '02	1.000	12	18-22	6,918	Limestone	Sand & same	Limestone	Same	100	11,047 64	11,048
75	Fabius-Apulia, Sec. 2	Onondaga	5, 17, '02	0.864	16	22	3,939	Limestone	Sand	Limestone	Same	100	9,150 00	10,590
76	La Fayette	Onondaga	5, 17, '02	1.000	16	24	3,855	Fieldstone	Sand	Limestone	Same	100	7,982 35	7,982
77	Albia-Wyantskill	Rensselaer	5, 6, '02	1.500	16	22	2,330	Local fld	Sand	Local fld	Same	100	12,180 00	8,120
78	Clifton, Sec. 1	Monroe	7, 2, '02	3.623	16	22	2,445	Limestone	Sand	Limestone	Same	100	30,996 20	8,555
79	Scottsville, Sec. 2	Monroe	6, 28, '02	7.588	16	22	2,096	Limestone	Sand	Limestone	Same	100	61,593 00	8,117
80	Hamlin, Sec. 1	Monroe	5, 20, '02	4.637	16	22	1,470	San b'ld'rs	Sand	Gran b'ld'rs	Same	100	39,000 00	8,410
81	Hamlin, Sec. 2	Monroe	5, 20, '02	4.057	16	22	1,470	San b'ld'rs	Sand	Gran b'ld'rs	Same	100	33,500 00	8,257
82	Buffalo, Sec. 1	Monroe	5, 20, '02	0.364	16	25	1,780	Limestone	Sand	Limestone	Same	100	3,280 00	9,011
83	Buffalo, Sec. 2	Monroe	5, 20, '02	5.089	16	22	1,607	Limestone	Sand	Limestone	Same	100	41,617 35	8,178
84	Troy and Brunswick, Sec. 3	Rensselaer	5, 12, '02	2.460	15	22	2,235	Local quart	Sandy loam	Local quart	Same & sand	100	22,259 16	9,048
85	Ft. Edward-Sandy Hill	Washington	5, 12, '02	0.920	18	22	1,521	Local li	Sand	Local li	Same	100	10,265 19	11,158
86	Big Tree	Erie	6, 11, '02	4.004	16	22	4,461	Lo b'ld'rs	Limestone	Gran b'ld'rs	Limestone	100	42,500 00	10,614
87	Main Street, Sec. 2	Erie	5, 9, '02	1.926	16	22	986	Limestone	Same	Limestone	Same	100	17,000 00	8,826
88	Transit, Sec. 1	Erie	5, 9, '02	4.283	16	22	1,909	Limestone	Same	Limestone	Same	100	39,205 80	9,154
89	Transit, Sec. 2	Erie	5, 9, '02	4.063	16	22	2,230	Limestone	Same	Limestone	Same	100	41,422 00	10,121
90	Grassy Point	Rockland	5, 12, '02	2.830	16	22	3,180	Local li	Same	Trap-rock	Limestone	100	23,692 00	8,372
91	Nyack Turnpike	Rockland	5, 20, '02	3.900	16	22	2,179	Lo gran ro	Sand	Lo gran ro	Same	100	29,830 06	7,649
92	Delmar-Slingerlands	Albany	5, 12, '02	1.740	16	22	3,793	Limestone	Li & sand	Limestone	Limestone	100	17,630 00	10,132
93	Florida-Warwick	Orange	6, 20, '02	4.670	.....	22	5,139	Gr, sh, br st	Same	Gr, sh, br st	Same	100	27,885 00	5,873
94	Monroe Avenue	Monroe	6, 9, '02	4.226	14-16	22, 24	1,850	Limestone	Same	Limestone	Same	100	35,400 00	8,376

95	Middletown Goshen	Orange	6, 20, '02	5.860		22	5,358	Gr, br, st	Same	Gr, br, st	Same	100	34,230 50	5,842
96	Amsterdam-Minaville, Sec. 2	Montgomery	5, 17, '02	0.644	12-14	22	8,540	Local fld	Sand	Local fld	Same	100	6,430 00	9,984
97	Shunpike Road	Washington	5, 12, '02	3.610	12	22	4,155	Local quart	Sand	Local quart	Sand & same	100	26,735 60	7,406
98	Webster, Sec. 1	Monroe	5, 20, '02	1.576	14-16	20, 22	4,700	Limestone	Same	Limestone	Same	100	19,600 00	12,437
99	Webster, Sec. 2	Monroe	6, 3, '02	2.960	14-16	20, 21, 22	2,000	Limestone	Same	Limestone	Same	100	32,800 00	11,081
100	Webster, Sec. 3	Monroe	7, 1, '02	3.398	16	22	1,324	San b'ld'rs	Sand	Gran b'ld'rs	Same	100	29,166 00	8,583
101	Webster, Sec. 4	Monroe	7, 1, '02	2.879	16	22	2,018	San b'ld'rs	Sand	Gran b'ld'rs	Same	100	23,374 70	8,119
102	Barracks	Rensselaer	5, 26, '02	2.050	8-12	16-22	6,390	Trap-rock	Sand	Trap-rock	Same	100	24,015 00	11,714
103	Granville-Middle Granville	Washington	5, 7, '02	1.310	16	22	2,061	Local quart	Same	Local quart	Sand & same	100	10,143 00	7,742
104	Granville and Troy Stage	Washington	5, 12, '02	1.250	16	22	3,088	Limestone	Sand	Limestone	Same	100	10,850 00	8,680
105	Quaker Street, Sec. 2	Schenectady	5, 17, '02	0.349	14-16	18-22	2,636	Limestone	Same	Limestone	Same	100	2,460 00	7,048
106	Quaker Street, Sec. 3	Schenectady	5, 17, '02	0.132	14-16	18-22	1,742	Limestone	Same	Limestone	Same	100	1,255 00	9,280
107	Fultonville-Glen	Montgomery	5, 12, '02	3.660	14-16	17-20-22	6,421	Li & lo fld	Sand	Li & lo fld	Same	100	36,545 00	9,985
108	West Mohawk River	Montgomery	5, 12, '02	3.250	14-16	20-22	3,938	Limestone	Sand	Trap-rock	Limestone	100	30,788 00	9,473
109	Argersinger	Fulton	5, 20, '02	2.300	14	20	2,478	Local fld	Same	Local fld	Same	100	17,681 54	7,688
110	Briggs	Fulton	5, 20, '02	2.250	14	20	2,578	Local fld	Same	Local fld	Same	100	17,316 50	7,696
111	Blodgetts Mills	Cortland	5, 23, '02	0.750	12	20	4,400	Lo qua san	Same	Trap-rock	Limestone	100	6,100 00	8,133
112	Norwich-Plymouth	Chenango	5, 20, '02	4.842	12	20	3,926	Lo qua san	Same	Trap-rock	Limestone	100	40,900 00	8,447
113	Cochecton, Sec. 1	Orange	6, 20, '02	2.290		22	7,511	Local li	Same	Local li	Same	100	23,693 14	10,346
114	Middletown Pine Bush, Sec. 2	Orange	6, 20, '02	1.210		16	3,140	Local shale	None	Local shale	None	100	4,106 80	3,311
115	Central Valley-Turner, Sec. 1	Orange	6, 20, '02	2.620		20	6,870	Gravel	None	Gravel	None	100	31,117 00	11,877
116a	Kingston-Rifton	Ulster	5, 19, '02	4.180	14	18 20	3,792	Lo san, trap	Sand	Lo san, trap	Limestone	100	40,059 59	9,583
116b	Kingston-Rifton	Ulster	5, 19, '02	0.890	14	18 20	2,247	Trap-rock	Sand	Trap-rock	Limestone	100	7,863 00	8,834
117	Ulster-Delaware, Sec. 2	Ulster	5, 15, '02	5.090	12-14	20-22	4,420	Lo "bl"	Same	Lo "bl"	Same	100	55,100 00	10,325
118	Shandaken-Hurley, Sec. 1	Ulster	5, 20, '02	4.000	14	20	2,300	Lo "bl"	Sand	Lo "bl"	Same	100	34,757 00	8,689
119	Loudon, Sec. 2	Albany	7, 25, '02	3.920	16	22	2,321	Lo san	Sand	Lo san	Same	100	37,500 00	9,566
120	Canajoharie-Sharon Springs	Montgomery	5, 22, '02	4.140	14	20	2,777	Lo fld	Sand	Lo fld	Same	100	36,546 70	8,828
121	Fabius-Aquila, Sec. 3	Onondaga	5, 17, '02	1.160	16	22	2,099	Limestone	Sand	Limestone	Same	100	9,950 00	8,577
122	East Lake	Onondaga	6, 18, '02	1.000	16	24	2,881	Limestone	Sand & same	Limestone	Same	100	9,500 00	9,500
123	Preble-Homer	Cortland	5, 29, '02	1.230	12	20	2,407	Fieldstone	Same	Li, quart, fld	Same	100	8,692 17	7,067
124	North	Albany	5, 12, '02	1.840	14	20	3,206	Li & lo fld	Sand	Limestone	Same	100	14,412 06	7,832
125	Lestershire	Broome	7, 2, '02	2.955	16	22	2,902	Fieldstone	Sand & same	Trap-rock	Limestone	100	28,800 00	9,746
126	Town Line Extension	Broome	7, 28, '03	1.970	12, 16	24, 26	Emb. 1,751	Fieldstone	Sand & same	Trap-rock	Trap-rock	100	19,260 80	9,777
127	Park Bridge	Broome	7, 28, '03	2.076	16	26	2,317	Fieldstone	Sand & same	Trap-rock	Trap-rock	100	24,532 71	11,817
128	Aurora-Buffalo, Sec. 1	Erie	7, 6, '03	5.573	16	22	2,055	Limestone	Sand	Li & granite	Limestone	100	53,567 13	9,612
129	River, Secs. 2-3	Erie	6, 22, '03	3.015	16	22	1,459	Limestone	Sand	Trap-rock	Limestone	100	26,013 00	8,627
130	Main Street, Sec. 3	Erie	7, 10, '03	5.625	16	22	1,195	Limestone	Sand	Limestone	Same	100	38,181 08	6,788
131	Main Street, Sec. 4	Erie	7, 10, '03	6.581	16	22	1,302	Limestone	Sand	Limestone	Same	100	50,739 61	7,710
132	Genesee Turnpike	Onondaga	7, 30, '03	1.130	16	26	Emb. 1,403	Limestone	Sand & same	Trap-rock	Limestone	100	9,600 00	8,495
133	Little Falls-Dolgeville	Herkimer	6, 10, '03	2.290	14	20	2,620	Lo gneiss	Sand	Lo gneiss	Same & li	100	19,504 65	8,517
134	Fenton	Broome	7, 29, '03	2.170	12, 16	24, 26	Emb. 1,876	Fieldstone	Sand & same	Trap-rock	Trap-rock	100	21,716 20	10,007
135	Violet Avenue	Dutchess	6, 19, '03	3.290	14	20	3,131	Local fld	Sand	Trap-rock	C'l'n Pt. li	100	31,801 91	9,666

Note. – Number 70 cancelled.

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Bottom. Kind of screenings or sand as filler.	Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Top. Kind of screenings or sand as filler.	Per cent completed.	TOTAL COST COMPLETED. Whole.	Per mile.
					Feet.	Feet.								
136	Windsor, Sec. 2	Clinton	6, 23, '03	1.750	16	22	Emb. 1,886	Local li	Same	Local li	Same	100	$14,013 00	$8,008
137	Plattsburg-Keeseville, Sec. 2	Clinton	6, 16, '03	4.520	16	22	Emb. 2,434	Local san	Sand	Local san	Same	100	36,010 36	7,967
138	Plattsburg-Mooers, Sec. 1	Clinton	6, 16, '03	7.570	14–16	20–22	3,157	Local san	Same	Lo san & li	Same	100	64,786 89	8,558
138a	Plattsburg-Mooers, Sec. 1	Clinton	1, 3, '05	7.570	14–16	20–22				Limestone	Same	100	8,150 18	1,076
139	Hamilton Bridge	Oneida	6, 24, '03	1.290	12, 16	24, 26	2,884	Fieldstone	Sa'dy l'm & same.	Limestone	Same	100	10,499 39	8,139
140	Seneca Turnpike	Oneida	10, 9, '03	2.280	12, 16	24, 26	2,135	Limestone	Sand & same	Limestone	Sand & same.	100	15,600 00	6,845
141	Kingston-Ellenville, Sec. 3	Ulster	6, 16, '03	6.820	12–14	20	Emb. 4,780	Lo. "bl" & li	Sand	Lo "bl" & li	Same	100	63,876 96	9,358
142	Saugerties-Woodstock, Sec. 3	Ulster	6, 16, '03	2.850	14	22	5,263	Local "bl"	Sand	Trap-rock	Bluestone	100	39,317 12	13,795
143	Echo Lake-Pines Bridge	Westchester	6, 15, '03	3.140	12	20	6,051	Lo gran ro	Same	Lo gran ro	Same	100	30,430 00	9,691
144	Bedford-Cross River	Westchester	6, 19, '03	5.300	12–14	20	5,094	Lo gran ro	Sand	Lo gran ro	Same	100	47,333 07	8,931
145	Delaware River	Delaware	7, 28, '03	1.000	16	22–26	6,545	Gravel	None	Gravel	None	100	6,240 00	6,240
146	Geneva-Canandaigua, Sec. 1	Ontario	6, 15, '03	5.624	14	22	1,547	Le Roy li	Sand	Le Roy li	Same	100	40,625 79	7,229
147	Burr's Mills	Jefferson	8, 7, '03	3.920	12, 44	14, 24	3,724	Limestone	Sand & same	Limestone	Same	100	26,700 00	6,811
148	Pines Bridge-Yorkt'n Heights	Westchester	6, 16, '03	3.490	12	20	5,014	Lo gran ro	Same	Lo gran ro	Same	100	33,543 41	9,611
148a	Pines Bridge-Yorkt'n Heights	Westchester	10, 5, '05	3.490								100	635 00	182
149	Yorkt'n Heights-Putnam Co.	Westchester	6, 16, '03	6.620	12	20	3,353	Local fld	Sand	Local fld	Same	100	51,232 71	7,739
150	Cross River-Turk Hill	Westchester	6, 19, '03	3.270	12, 14	20	6,575	Lo gran ro	Sand	Lo gran ro	Same	100	31,717 17	9,700
151	Turk Hill-Putnam Co. Line	Westchester	6, 19, '03	5.990	12	20	6,102	Lo gran ro	Sand	Lo gran ro	Same	100	62,104 62	10,368
152	Fonda "East"	Montgomery	6, 20, '03	2.500	16	22	2,560	Local fld	Sand	Local fld	Same	100	19,333 00	7,733
152a	Fonda "East"	Montgomery	11, 7, '06	2.500								100	3,267 00	1,307
153	Newburgh-Campbell Hall	Orange	6, 24, '03	13.380	12	20	4,484	Local fld	Same	Local fld	Same	100	86,816 67	6,488
154	Chester-Vails Gate	Orange	6, 24, '03	11.490	12	20	4,917	Gravel	None	Gravel	None	100	51,837 20	4,511
154a	Chester-Vails Gate	Orange	7, 20, '06	11.490	12			Local fld	Sand	Local fld	Same	100	26,463 80	2,303
154b	Craigville Undergrade Crossing	Orange	1, 20, '08									85		
155	Fonda "West"	Montgomery	6, 20, '03	2.500	16	22	4,800	Local fld	Sand	Local fld	Same	100	24,016 77	9,607

156	Chester-Goshen	Orange	7, 12, '04	3.10	....	22	Emb. 10,097	Gravel	None	Gravel	None	100	25,595 37	8,256
156a	Chester-Goshen	Orange	9, 1, '06	3.10	....	....		....	....	....	....	100	628 25	203
157	Woodbury-Central Valley	Orange	7, 20, '06	3.48	18	22	Emb. 4,741	Gravel	None	Gravel	None	100	20,237 07	5,815
158	Northampton	Montgomery	9, 1, '06	0.70	14	22	2,416	Local fld	Sand	Local fld	Same	100	7,565 00	10,807
159	Middletown-Slate Hill	Orange	6, 15, '04	3.49	....	22	5,731	Gravel	None	Gravel	None	100	15,845 90	4,569
160	Slate Hill-Unionville	Orange	6, 18, '04	8.38	12	22	5,609	Gravel	None	Gravel	None	100	50,879 44	6,072
161	Newburgh-Shawangunk	Orange	6, 18, '04	8.61	12	20	3,310	Local stone	Same	Lo & sh	Same	100	69,206 64	8,038
162	Oneonta	Otsego	6, 9, '04	1.39	14	20	2,968	Local stone	Sand	Local stone	Limestone	100	11,860 57	8,533
163	Broadway-Fort Hunter	Schenectady	6, 17, '04	1.71	16	22	2,193	Limestone	Sand	Limestone	Same	100	14,907 00	8,717
164	Downesville	Delaware	....	4.20	....	16	6,000	....	....	....	....	....	....	....
165	Little Ridge, Sec. 2	Monroe	6, 14, '04	2.062	16	22	1,625	Sandstone	Sand & same	Granite	Granite & san	100	14,972 38	7,261
166	Penfield, Sec. 1	Monroe	6, 7, '04	3.635	14-16	20-22	3,411	Limestone	Sand	Limestone	Same	100	29,337 63	8,071
166a	Penfield, Sec. 1	Monroe	....	3.635	....	....	....	....	....	....	....	100	162 38	45
167	Penfield, Sec. 2	Monroe	6, 17, '04	5.313	12-14-16	18-20-22	2,070	Local fld	Sand	Granite	Gran & fld	100	32,200 00	6,061
167a	Penfield, Sec. 2	Monroe	....	5.313	....	....	....	....	....	....	....	100	870 45	164
168	Dugway, Sec. 1	Monroe	6, 17, '04	3.300	14-15-16	20-21-22	Emb. 8,258	Local fld	Sand	Local li	Same	100	34,800 00	10,545
169	Dugway, Sec. 2	Monroe	6, 18, '04	4.019	12	18	1,592	Local li	Sand	Local li	Same	100	21,012 75	5,228
170	Dugway, Sec. 3	Monroe	6, 17, '04	2.88	12	18	1,774	Local li	Sand	Local li	Same	100	15,374 36	5,338
171	Lake, Sec. 1	Monroe	6, 14, '04	2.00	16	22	1,915	Local li	Sand	Local li	Same	100	14,398 92	7,199
172	Portland Avenue, Sec. 1	Monroe	10, 15, '04	0.703	16	22	Emb. 2,297	Local li	Sand	Local li	Same	100	7,391 20	10,513
173	Hudson Avenue, Sec. 2	Monroe	10, 15, '04	0.995	16	22	1,420	Limestone	Sand	Limestone	Same	100	9,069 86	9,115
174	Endicott	Broome	6, 16, '04	2.17	16	22-27	3,180	Fieldstone	Same	Trap-rock	Limestone	100	22,500 00	10,368
175	Chenango Tow-path	Broome	6, 16, '04	1.836	12	16	Emb. 1,514	Fieldstone	Same	Trap-rock	Limestone	100	13,492 10	7,348
176	Albany-Schenectady	Albany	7, 26, '04	2.31	16	32	2,165	Limestone	Sand	Limestone	Same	100	21,447 00	9,284
177	Schoharie, Secs. 1-2	Albany	6, 9, '04	5.00	14-16	20-22	3,240	Local fld	Sand	Limestone	Same	100	42,921 55	8,544
178	Delaware Turnpike, Sec. 3	Albany	6, 8, '04	7.38	12	20	5,312	Limestone	Sand	Limestone	Same	100	85,886 28	11,637
178a	Delaware Turnpike, Sec. 3	Albany	10, 16, '06	7.38	....	....	....	....	....	....	....	100	3,094 45	419
179	Schenectady-Albany	Schenectady	6, 17, '04	2.35	16	32	3,830	Limestone	Sand	Limestone	Same	100	28,510 67	12,132
180	East Mohawk Turnpike	Montgomery	6, 17, '04	2.82	16	22	3,794	Limestone	Sand	Limestone	Same	100	26,175 03	9,282
180a	East Mohawk Turnpike	Montgomery	11, 7, '06	2.82	....	....	....	....	....	....	....	100	924 97	328
181	W't'n-S. H'b'r-Hend'n, Sec. 1	Jefferson	6, 16, '04	6.04	12	26	3,013	Limestone	Sand	Limestone	Same	100	47,848 30	7,922
182	Redwood Alex. Bay, Sec. 1	Jefferson	7, 14, '04	2.976	12	25	1,613	Local san	Sand & same	Lo qua gran	Same	100	30,645 57	10,297
183	Adams-Henderson, Sec. 1	Jefferson	6, 18, '04	3.03	12	26	Emb. 2,706	Gran b'ld'rs	Sand & same	Gran b'ld'rs	Same	100	21,900 00	7,228
184	Pierrepont Manor-Ellisburg	Jefferson	6, 16, '04	2.955	12	26	2,809	Gran b'ld'rs	Sand	Limestone	Same	100	21,321 45	7,119
185	State	Jefferson	6, 15, '04	1.00	12	26	5,800	Gran b'ld'rs	Sand	Gran b'ld'rs	Same	100	8,792 15	8,792
186	Depot	Jefferson	10, 19, '04	0.99	12-16	26	2,043	Limestone	Sand	Limestone	Same	100	6,800 00	6,868
187	Bristol	Ontario	6, 11, '04	1.720	12-16	....	2,442	Le Roy li	Sand	Le Roy li	Same	100	15,517 26	9,022
188	Bristol Valley, Sec. 1	Ontario	7, 14, '04	4.830	12	18	Emb. 2,600	Lo fld	Sand	Lo gran fld	Same	100	39,346 56	8,146
188a	Bristol Valley, Sec. 1	Ontario	....	4.830	....	....	....	....	....	....	....	100	153 00	32
189	East Side-Lake, Sec. 2	Ontario	6, 10, '04	1.286	12	18	2,177	Le Roy li	Sand	Le Roy li	Same	100	11,092 66	8,626
190	East Side-Lake, Sec. 1	Ontario	6, 10, '04	2.368	12	18	1,848	Local stone	Sand	Lo fld	Same	100	18,200 00	7,685

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Bottom. Kind of screenings or sand as filler.	Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Top. Kind of screenings or sand as filler.	Per cent completed.	TOTAL COST COMPLETED. Whole.	TOTAL COST COMPLETED. Per mile.
					Feet.	Feet.								
190a	East Side Lake, Sec. 1	Ontario		2 368								100	$500 00	$211
191	Honeoye-Hemlock	Ontario	6, 17, '04	4.549	12	18	3,526	Gran b'ld'rs	Sand	Gran b'ld'rs	Same	100	38,662 82	8,499
191a	Honeoye-Hemlock	Ontario		4.549								100	1,162 82	256
192	Beaver Dam	Albany	6, 9, '04	3.54	14	20	3,616	Limestone	Sand	Limestone	Same	100	35,867 01	10,031
193	River	Albany	6, 11, '04	8 13	12 14 16	26	4,055	Limestone	Sand	Trap-rock	Limestone	100	69,055 56	8,493
193a	River Road	Albany	5, 29, '06	8.13								100	8,234 46	1,013
194	Sand Lake Troy	Rensselaer	6, 10, '04	1.49	14-20	22	3,812	Limestone	Sand	Limestone	Same	100	15,042 55	10,096
195	Wynantskill-W. Sand Lake	Rensselaer	6, 23, '04	4.01	14	22	3,092	Limestone	Sand	Limestone	Same	100	38,773 72	9,669
196	East Nassau	Rensselaer	6, 23, '04	3.02		18	3,344	Gravel	None	Gravel	None	100	14,252 50	4,719
196a	East Nassau	Rensselaer	8, 18, '06	3.02								100	744 50	247
197	Brick Church-Rock Hollow	Rensselaer	6, 13, '04	3.33	14	20	3,172	Local fld	Sand	Local fld	Same	100	33,440 94	10,042
198	Delaware Turnpike, Sec. 4	Albany	6, 9, '04	6.527	12	20	6,833	Limestone	Sand	Limestone	Same	100	66,967 87	10,260
199	Delaware Turnpike, Sec. 5	Albany	6, 9, '04	7.871	12	20	4,828	Local stone	Sand & same	Local stone	Same	100	61,070 47	7,758
200	Old Northern Turnpike	Rensselaer	7, 12, '04	2.75	14-20	20	2,746	Limestone	Sand	Limestone	Same	100	26,244 31	9,543
201	Troy Poestenkill	Rensselaer	6, 13, '04	3.60	14-16	22	2,014	Limestone	Sand	Limestone	Same	100	30,472 24	8,465
201a	Troy Poestenkill	Rensselaer	12, 13, '06	3.60								100	2,977 76	827
202	Boston-Albany	Rensselaer	6, 20, '04	5.42	16	30	3,000	Local shale	Sand	Trap-rock	Local shale	100	51,261 27	9,458
202a	Boston-Albany	Rensselaer	4, 30, '06	5.42								100	600 00	110
203	Gorham Stanley	Ontario	6, 10, '04	2.197	12-16	18-22	3,560	Le Roy li	Sand	Le Roy li	Same	100	19,295 27	8,783
203a	Gorham-Stanley	Ontario	9, 19, '06	2.197										
204	Naples-Atlanta	Ontario	6, 11, '04	0.585	12	18	1,538	Le Roy li	Sand	Le Roy li	Same	100	5,348 84	9,143
205	Naples-Woodville	Ontario	6, 16, '04	3 451	12	18	5,368	Le Roy li	Sand	Le Roy li	Same	100	39,000 00	11,301
206	Reeds Corners	Ontario	7, 10, '06	2.669	12	18	1,922	Local gr	Sand	Local gr	Same	100	20,646 70	7,736
207	Geneva-Canandaigua, Sec. 2	Ontario	7, 14, '04	6.213	14	22	2,245	Local "bl"	Sand	Local "bl"	Same	100	52,432 38	8,438
208	Cortland-Homer	Cortland	12, 31, '06	0.54	16, 20		3,111	Limestone	Sand	Trap-rock	Limestone	96		
209	Nineveh	Broome	6, 16, '04	0.934	16	24 28	1,852	Fieldstone	Same	Limestone	Same	100	7,539 68	8,072
10	Harpursville	Broome	6, 16, '04	0 85	16-20	26 28	3,647	Fieldstone	Same	Limestone	Same	100	11,281 63	13,272
11	Center Village	Broome	6, 16, '04	0.574	12-16	24	4,007	Fieldstone	Same	Limestone	Same	100	4,639 71	8,083
12	Ouaquaga	Broome	6, 16, '04	1.01	12-16	24	3,218	Fieldstone	Same	Limestone	Same	100	8,937 86	8 89
13	River Road, Windsor, Sec. 2	Broome	6, 16, '04	2 828	16	28	4,102	Fieldstone	Same	Limestone	Same	100	31,144 44	11,013

214	River Road, Windsor, Sec. 1	Broome	6, 16, '04	1.868	14	28	4,122	Fieldstone	Same	Limestone	Same	100	15,911 77	8,518
215	Dryden	Cortland	6, 13, '04	2.00	16	28	Emb. 2,250	Fieldstone	Same	Limestone	Same	100	15,412 00	7,706
216	Roxbury	Delaware	7, 14, '04	0.95	18-35	18-35	1,821	Local " bl "	Same	Local " bl "	Same	100	10,787 29	11,355
217	Grand Gorge	Delaware	7, 14, '04	1.00	14	20	2,320	Local stone	Sand	Local stone	Same	100	9,569 47	9,569
218	Greene-Smithville Flats	Chenango	7, 13, '04	4.68	12	26	3,205	Local " bl "	Sand	Limestone	Local " bl "	100	37,700 00	8,055
219	Richfield Spa-Cherry Valley	Otsego	8, 6, '04	0.68	14	20	3,309	Limestone	Sand	Limestone	Same	100	6,488 33	7,541
220	Worcester	Otsego	7, 14, '04	0.98	16-50	22-50	1,880	Limestone	Sand	Limestone	Same	100	10,752 61	10,972
221	Edmeston	Otsego	6, 14, '04	0.50	22	24	2,500	Crushed gr.	Same	Limestone	Same	100	7,221 15	14,442
222	Hughsonville	Dutchess	6, 13, '04	3.467	14-20	20	3,547	Fieldstone	Sand	Fieldstone	Same	100	31,979 04	9,224
223	South	Dutchess	7, 20, '04	3.904	16	22	2,869	Limestone	Sand	Trap-rock	Limestone	100	44,301 79	11,347
224	Oxford-McDonough	Chenango	7, 9, '04	5.82	10	22	Emb. 2,577	Fieldstone	Same	Local " bl "	Same	100	37,548 06	6,451
225	Guilford	Chenango	7, 13, '04	5.75	12-16	26-28	1,922	Fieldstone	Sand	Limestone	Fieldstone	100	47,588 71	8,276
227	Brunswick Turnpike	Rensselaer	7, 9, '06	3.10	14	24-28	2,188	Local stone	Sand	Trap-rock	Local stone	100	28,050 70	9,048
228	Saugerties-Kingston	Ulster	6, 29, '06	5.66	14, 16	24, 26, 28	2,814	Local stone	Sand	Local stone	Same	100	53,661 18	9,481
228a	Saugerties-Kingston	Ulster	12, 7, '06	5.66								100	3,800 00	671
229	Kingston-High Falls	Ulster	10, 1, '06	6.93	14			Local stone	Sand	Local stone	Same	100	74,080 00	10,690
230	Kingston-Ellenville, Sec. 1	Ulster	7, 11, '06	8.27	16	24, 26, 28	3,064	Local stone	Sand	Local stone	Same	100	81,434 09	9,847
231	Post, Sec. 1	Ulster	7, 7, '06	7.08	14	26	3,659	Local stone	Sand	Local stone	Same	100	60,560 15	8,554
232	Old State	Essex	7, 9, '06	2.64	14	28, 30	1,984	Local stone	Sand	Local stone	Same	100	21,000 00	7,955
233	Frankford-E. Schuyler	Herkimer	7, 9, '06	1.64	16	26	2,043	Local stone	Sand	Trap-rock	Same	100	12,810 78	7,811
234	Adams Henderson, Sec. 2	Jefferson	7, 7, '06	6.89	12	22-26	2,279	Limestone	Sand	Limestone	Same	99		
235	Wat'n-Sack. H'bor-Hds'n, Se. 2	Jefferson	7, 7, '06	2.23	12, 16	26	Emb. 1,009	Limestone	Sand	Limestone	Same	100	17,986 46	8,621
236	Redwood-Alex. Bay, Sec. 2	Jefferson	9, 20, '07	4.19	12-16-20	24-26 28 40	1,470	Hard gr.	Sand	Hard gr.	Limestone	45		
237	Sacketts Harbor	Jefferson	7, 9, '06	1.45	16	26	Emb. 2,207	Limestone	Sand	Limestone	Same	100	12,700 00	8,759
238	Henderson Harbor	Jefferson	7, 7, '06	5.09	12	22, 24	1,660	Limestone	Sand	Limestone	Same	100	33,852 52	6,651
239	Delhi-Middletown	Delaware	8, 30, '06	4.96	14, 16	25, 26	5,586	Local stone	Sand	Local stone	Same	100	46,559 84	9,387
240	Cohoes-Waterford	Saratoga	7, 3, '06	1.00	35	35	2,168	Concrete	Sand	Vit. brick		100	32,418 22	32,418
241	Saratoga-Ballston	Saratoga	7, 13, '06	4.335	16	32	1,996	Local stone	Sand	Trap-rock	Same	100	33,401 66	7,705
242	Saratoga-Glens Falls, Sec. 2	Saratoga	7, 13, '06	1.25	14	26	2,301	Local stone	Sand	Trap-rock	Same	100	8,558 20	6,847
243	Mechanicville-Stillwater	Saratoga	7, 9, '06	1.84	16	28	Emb. 3,960	Local stone	Sand	Trap-rock	Same	100	25,556 30	13,889
244	Saratoga-Schuylerville	Saratoga	7, 9, '06	6.01	14	24, 26	3,861	Approved st.	Sand	Trap-rock	Same	100	53,623 43	8,922
245	Coleman Hill, Sec. 1	Onondaga	9, 20, '07	1.21	12	22-24-26	6,364	Limestone	Sand	Limestone	Same	88		
246	Gloversville-Meco-Phelps	Fulton	7, 12, '06	2.03	14, 16	26	2,360	Approved st.	Sand	Approved st.	Same	100	17,098 82	8,423
247	J'nst'n-Keck's Center, Sec. 2	Fulton	7, 9, '06	4.67	12, 14	22, 24	5,001	Local stone	Sand	Local stone	Same	90		
248	Gloversville-Broadalbin	Fulton	9, 1, '06	2.02	12	24	3,676	Local stone	Sand	Local stone	Same	100	16,091 18	7,966
249	Old Plank	Fulton	7, 6, '06	3.14	14	24, 28, 32	2,323	Local stone	Sand	Local stone	Same	100	28,000 00	8,917
250	Utica-Oneida Castle, Sec. 1	Oneida	7, 10, '06	8.53	16-23	22, 23, 32	3,693	Limestone	Sand	Li and gneiss	Limestone	100	146,707 70	17,199
251	Griswold Street	Niagara	7, 5, '06	3.15	14	18	1,687	Li or lo stone	Sand	Limeston	Same	100	18,379 79	5,835
252	Clifton, Sec. 2	Monroe	7, 11, '06	2.92	12	18	1,812	Lo fld	Sand	Limestone	Same	100	21,623 00	7,405
253	Lyell	Monroe	7, 11, '06	2.12	16, 20	26, 30	2,370	Li or lo stone	Sand	Limestone	Same	100	20,285 75	9,569
254	Chili, Sec. 1	Monroe	7, 11, '06	3.11	16	22	1,951	Li or lo stone	Sand	Limestone	Same	97		

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Bottom. Kind of screenings or sand as filler.	Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Top. Kind of screenings or sand as filler.	Per cent completed.	TOTAL COST COMPLETED. Whole.	Per mile.
					Feet.	Feet.								
255	Chili, Sec. 2	Monroe	7, 11, '06	2.56	16	22	2,285	Li or lo stone	Sand	Limestone	Same	64	....	....
256	Little Ridge, Sec. 3	Monroe	7, 13, '06	3.60	16	28	1,705	Lo fld	Sand	Local gran	Same	100	$25,880 78	$7,189
257	Little Ridge, Sec. 4	Monroe	7, 11, '06	3.36	16	22	1,339	Lo fld	Sand	Local gran	Same	100	26,250 00	7,813
258	Plattsburg-Keeseville, Sec. 3	Clinton	7, 9, '06	5.44	14, 16	28-32	Emb. 1,817	Local stone	Sand	Local stone	Same	100	48,221 77	8,864
259	Plattsburg-Mooers, Sec. 2	Clinton	7, 6, '06	7.34	14	28	Emb. 2,635	Local stone	Sand	Limestone	Same	100	59,496 25	8,106
260	Plattsburg-Mooers, Sec. 3	Clinton	8, 1, '06	4.31	14	26, 28	2,023	Local stone	Sand	Local stone	Same	100	39,057 16	9,062
261	Peekskill-Salem Center, Sec. 1	Westchester	7, 6, '06	5.86	14, 16	24-32	2,129	Local stone	Sand	Local stone	Same	100	44,720 26	7,631
262	Peekskill-Salem Center, Sec. 2	Westchester	7, 6, '06	4.66	14	24	1,928	Local stone	Sand	Local stone	Same	100	33,373 14	7,162
263	Aurora-Buffalo, Sec. 2	Erie	7, 18, '06	4.23	16	22-32	2,381	Li or lo stone	Sand	Limestone	Same	100	39,486 95	9,335
264	Aurora-Buffalo, Sec. 3	Erie	7, 10, '06	0.74	16	22	2,007	Li or lo stone	Sand	Limestone	Same	100	6,532 51	8,828
265	Deposit	Broome	7, 12, '06	2.78	14	23	3,381	Fieldstone	Sand	Trap-rock	Limestone	100	26,678 30	9,597
266	Tunnel	Broome	7, 12, '06	1.70	12	26	Emb. 2,529	Fieldstone	Sand	Trap-rock	Limestone	100	13,341 55	7,848
267	Castle Creek	Broome	7, 12, '06	6.00	12	23-26	Emb. 2,133	Fieldstone	Sand	Fld	Same	100	55,109 27	9,185
268	Bridge	Broome	7, 12, '06	1.00	12, 16	26, 28	3,447	Fieldstone	Sand	Trap-rock	Limestone	100	10,629 79	10,630
269	Hilton	Monroe	7, 11, '06	4.30	12	18	1,817	Lo fld	Sand	Local gran	Same	100	26,970 78	6,272
270	Birch Hill	Nassau	7, 10, '06	1.16	16	32	3,095	Trap-rock	Sand	Trap-rock	Same	100	11,728 34	10,111
271	Utica-Oneida Castle, Sec. 2	Oneida	9, 15, '06	8.53	16	32	2,849	Limestone	Sand	Li and gneiss	Limestone	96	....	....
272	Orchard Park, Sec. 5	Erie	7, 10, '06	1.21	16	28	2,256	Limestone	Sand	Limestone	Same	100	13,700 00	11,322
273	Seneca River, North Side	Seneca	12, 4, '07	1.30	16	....	....	Local stone	Sand	Local stone	Same	93	....	....
274	Gulf Bridge, Sec. 1	Broome	7, 12, '06	1.75	12	24-26	4,514	Fieldstone	Sand	Fieldstone	Same	100	14,175 84	8,100
275	Union-Maine	Broome	7, 12, '06	3.04	12	24	Emb. 3,476	Fieldstone	Sand	Fieldstone	Same	97	....	....
276	Barnards Crossing, Secs. 1 and 2	Monroe	7, 13, '06	4.14	16	22	2,174	Lo fld	Sand	Limestone	Same	100	39,200 00	9,469
277	Lake Pleasant-Speculator	Hamilton	7, 12, '06	3.44	12	26	Emb. 3,427	Local stone	Sand	Local stone	Same	56	....	....
278	Syracuse-Watertown	Oswego	9, 20, '07	2.41	16	26	1,772	Local stone	Sand	Limestone	Same	84		

279	West Oswego River	Oswego	9, 20, '07	2 48		16	25	2,067	Local stone	Sand	Trap-rock	Same	91	
280	Oswego-Sterling	Oswego	9, 18, '06	1.66		16	26	Emb. 1,386	Fieldstone	Sand	Trap-rock	Limestone	100	18,135 95	9,720
282	Greenville-Slate Hill	Orange	8, 30, '06	7.13		12	26	5,007	Local stone	Sand	Local stone	Same	100	59,792 95	8,396
283	Greenville-Port Jervis	Orange	9, 4, '06	5.11		12	26	8,395	Local stone	Sand	Local stone	Same	100	63,799 50	12,485
284	Averill Park-Crooked Lake	Rensselaer	7, 2, '06	3.61	14, 16, 20		26	2,431	Local stone	Sand	Local stone	Same	100	32,132 85	8,901
285	Nassau-Brainard	Rensselaer	7, 7, '06	3.65		12	24-26	5,507	Local stone	Sand	Local stone	Same	100	31,784 64	8,703
286	Left Fork-German Church-Redman Road	Monroe	9, 20, '07	5.55		12	26	2,033	Local stone	Sand	Granite		56		
287	Rensselaer-Best	Rensselaer	8, 30, '06	4.75	12, 20		26	Emb. 3,023	Local stone	Sand	Local stone	Same	100	40,203 75	8,464
288	Troy-Sand Lake, Sec. 2	Rensselaer	7, 3, '06	3.72		18	26	2,029	Gravel	None	Gravel	None	100	16,867 35	4,534
289	Crescent Avenue	Suffolk	9, 3, '07	1.91		16			Approved st	Sand	Trap-rock	Same			
290	South Salina Street	Onondaga	8, 31, '06	1.06		16	26	Emb. 1,981	Limestone	Sand	Syenite	Limestone	100	12,127 22	11,441
291	Cemetery	Onondaga	9, 18, '07	0.89		16			Limestone	Same	Limestone	Same	100	10,111 65	11,361
292	West Lake, Sec. 2	Onondaga	7, 10, '06	1.00		16	26	Emb. 2,500	Approved st	Same	Limestone	Same	30		
293	East Lake, Sec. 2	Onondaga	7, 10, '06	1.00		16	26	Emb. 2,100	Fieldstone	Sand	Limestone	Same	63		
294	Clover Street, Sec. 1	Monroe	9, 17, '07	5.89		12	24-32	3,108	Local stone	Sand	Lo gran fld.	Lo stone	91		
295	Mohawk River Road, Floyd	Oneida	7, 10, '06	2.80		16	26	2,929	Limestone	Sand	Gneiss	Limestone	100	31,043 81	11,087
296	Mohawk River Road, Marcy	Oneida	7, 10, '06	4 54		16	26	Emb. 2,844	Limestone	Sand	Gneiss	Limestone	100	52,078 64	11,471
297	Mohawk River Road, Deerfield	Oneida	7, 10, '06	3 74		16	26	Emb. 1,568	Limestone	Sand	Gneiss	Limestone	100	43,100 00	11,524
298	Amsterdam-Hagaman	Montgomery	7, 9, '06	2.20		14	24	1,856	Local stone	Sand	Local stone	Same	100	14,824 10	6,738
299		Montgomery	7, 11, '06	2.77		12	22	4,034	Local stone	Sand	Local stone	Same	100	26,372 10	9,521
300		Montgomery	7, 11, '06	1.13		12	22	2,090	Local stone	Sand	Local stone	Same	100	10,200 00	9,027
301	Minaville-Scotch Bush	Montgomery	7, 9, '06	2.34		12	22, 24, 26	1,747	Local stone	Sand	Local stone	Same	100	16,000 00	6,838
302	Fonda-Berryville	Montgomery	7, 9, '06	2.00		14	24	Emb. 3,295	Local stone	Sand	Trap-rock	Same	100	17,300 00	8,650
303	Fonda-Tribes Hill	Montgomery	9, 3, '07	2.21		16			Approved st.	Sand	Trap-rock, gran or gneiss	Same	100	19,184 46	8,681
304	Sprakers-Rural Grove	Montgomery	9, 3, '07	5 66		14			Approved st	Sand	Approved st.	Same	35		
305	Kingston-Edenville, Sec. 2	Ulster	7, 3, '06	7 25		16	22, 26, 26	4,218	Local stone	Sand	Local stone	Same	100	63,199 60	8,717
306	Kingston-Ulster Landing	Ulster	9, 3, '07	5 564		16			Approved st	Sand	Trap-rock	Same	100	51,385 12	9,235
307	Plattekill-Modena	Ulster	9, 3, '07	7 16		14			Approved st	Sand	Approved st	Limestone	100	58,214 19	8,130
308	New Paltz-Rifton	Ulster	1, 10, '06	4 16		14			Approved st.	Sand	Approved st.	Same	100	47,630 65	11,464
312	1	Orange	9, 4, '06	4 396		12	22	4,595	Local stone	Sand	Local stone	Same	100	37,333 20	8,493
313		Orange	9, 3, '07	5.18		12			Approved st	Sand	Approved st	Same	100	51,369 00	9,921
314		Otsego	6, 30, '06	4.37		16	26, 26	3,368	Local stone	Sand	Local stone	Same	100	52,782 85	12,078
315	Morris-Gilbertsville, Sec. 1	Otsego	7, 9, '06	3.537		16	24-26	2,679	Local stone	Sand	Local stone	Same	100	29,892 80	8,437
316	Colbers-Emmons	Otsego	7, 10, '06	1.26		16	26-26	3,059	Local stone	Sand	Local stone	Same	100	12,750 00	10,119
317	Shady Side-Otego	Otsego	7, 10, '06	2.73		16	26	Emb. 2,256	Limestone / Lo qua stone	Same / Same	Limestone / Trap-rock	Same / Same & B.	100	24,261 79	8,887
318	Colliersville-Milford Center	Otsego	6, 30, '06	2 03		14	24	4,169	Local stone	Sand	Local stone	Same	100	18,871 15	9,296
319	Schenevus-Maryland	Otsego	6, 30, '06	3.66		16	22, 26, 32	4,058	Limestone	Sand	Limestone	Same	100	34,780 92	9,497

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	Materials. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Materials. Bottom. Kind of screenings or sand as filler.	Materials. Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Materials. Top. Kind of screenings or sand as filler.	Per cent completed.	Total Cost Completed. Whole.	Total Cost Completed. Per mile.
					Feet.	Feet.								
320	Reservation Road, Fayette	Seneca	9, 18, '07	5.72	16	28	1,171	Limestone	Sand	Limestone	Same	53	....	....
328	Valley Road-Marcellus	Onondaga	8, 31, '06	1.31	12	26	4,484	Limestone	Same	Limestone	Same	100	$18,846 35	$14,387
329	Valley Road Camillus	Onondaga	11, 23, '06	2.32	12	24-26	4,828	Limestone	Sand	Limestone	Same	100	30,972 03	13,350
330	Skaneateles-Hamilton Turnpike, Sec. 1	Onondaga	9, 20, '07	2.44	14	22-24 26-28	3,893	Local stone	Sand	Limestone	Same	81	....	....
331	Peekskill-Salem Center, Sec. 3	Westchester	7, 20, '06	3.88	14, 16	26-28	2,921	Local stone	Sand	Local stone	Same	100	47,164 20	12,156
332	Peekskill-Salem Center, Sec. 4	Westchester	7, 20, '06	3.23	14	24-28	4,585	Local stone	Sand	Local stone	Same	100	35,898 45	11,114
333	Geneva-Canandaigua, Sec. 3	Ontario	7, 10, '06	1.09	14	22	2,867	Limestone	Sand	Limestone	Same	100	9,385 93	8,611
334	Lyons-Geneva	Ontario	7, 10, '06	1.69	16	32	1,982	Limestone	Sand	Limestone	Same	100	15,153 43	8,967
335	Victor-Mendon, Sec. 1	Ontario	7, 5, '06	5.20	12	24-32	2,841	Local stone	Sand	Limestone	Same	100	41,295 40	7,941
336	Cayuga Heights	Tompkins	8, 30, '06	3.17	12	24, 26, 28	Emb. 6,151	Local stone	Sand	Limestone	Same	87	....	....
337	Syracuse Turnpike	Madison	9, 20, '07	1.58	12	26	2,136	Limestone	Sand	Limestone	Same	44	....	....
338	Catskill Turnpike, Sec. 2	Tompkins	8, 30, '06	1.38	16	26	4,891	Fieldstone	Sand	Limestone	Same	99	....	....
339	Georgetown	Madison	9, 18, '06	3 29	12, 16	22, 26	3,040	Local stone	Sand	Limestone	Same	93	....	....
340	Saratoga-Corinth	Saratoga	7, 6, '06	7.25	14	28	2,595	Local stone	Sand	Trap-rock	Limestone	100	52,920 83	7,299
341	Stockport-Hudson	Columbia	7, 6, '06	2.60	16	26-28	Emb. 2,151	Local stone	Sand	Trap-rock	Same	100	23,047 69	8,864
342	Chatham-Chatham Center	Columbia	8, 28, '06	1.12	16	24	7,501	Gravel	None	Gravel	None	100	7,229 60	6,455
343	Pawling-Patterson	Dutchess	7, 7, '06	2.23	14	24-26	Emb. 3,928	Local stone	Sand	Local stone	Same	100	24,078 97	10,798
344	Millerton-Northeast Center	Dutchess	7, 9, '06	1.78	14	24-26	4,284	Local stone	Sand	Local stone	Same	100	17,950 01	10,084
345	Canajoharie-Sprout Brook	Montgomery	12, 18, '07	4.66	14	....	....	Approved st	Sand	Approved st.	Same	46	....	....
348	Collamer	Onondaga	7, 9, '06	1.90	16	26	Emb. 1,842	Limestone	Sand	Limestone	Same	98	....	....
355	Wellsburg	Chemung	3, 9, '08	4.51	16	....	....	....	....	....	....	60	....	....
356	Erin-Horseheads	Chemung	7, 7, '06	9.22	16	24-32	Emb. 2,282	Limestone	Sand	Limestone	Same	100	93,807,99	10,174
357	Grand Central Ave	Chemung	9, 13, '06	1.57	16	28-32	2,051	Limestone	Sand	Trap-rock	Limestone	100	15,754 30	10,035

358	Horseheads–Corning	Chemung	12, 2, '07	7.14	16	....	....					81	....	....
359	Frankfort–Utica, Sec. 2	Herkimer	7, 10, '06	1.89	16	26	2,711	Local stone	Sand	Trap-rock	Same	100	16,748 34	8,862
360	Poland–Cold Brook	Herkimer	7, 2, '06	0.35	16	26	3,006	Local stone	Sand	Trap-rock	Same	100	4,150 00	11,857
361	Johnstown–Tribes Hill, Sec. 1	Fulton	7, 9, '06	2.22	16	26	4,041	Local stone	Sand	Local stone	Same	100	20,267 60	9,130
362	Northville–Chapman's Cor's	Fulton	9, 3, '07	1.71	14	....	....	Approved st.	Sand	Trap-rock	Same	100	19,085 05	11,161
363	Mayfield–Northville, Sec. 1	Fulton	9, 3, '07	1.37	14	....	....	Approved st.	Sand	Approved st.	Limestone	100	11,193 85	8,171
364	Preston Hollow–Potter Hollow	Albany	7, 12, '06	3.13	14	24–26	3,304	Local stone	Sand	Local stone	Same	100	24,441 26	7,809
365	Guilderland Center–Guilderland	Albany	7, 3, '06	1.89	14	24	2,662	Local stone	Sand	Trap-rock	Same	100	16,847 42	8,914
366	New Scotland–Wolf Hill	Albany	7, 11, '06	6.85	12, 14	24	5,102	Local stone	Sand	Local stone	Same	100	78,422 97	11,449
367	Glenmont–Feura Bush	Albany	7, 6, '06	6.77	12	22–24	2,802	Local stone	Sand	Limestone	Same	100	62,750 00	9,269
368	Augusta Road–Augusta	Oneida	11, 23, '06	3.38	14	28	Emb. 2,663	Limestone	Same	Limestone	Same	99	....	....
369	Augusta Road–Oriskany Falls	Oneida	8, 29, '06	2.99	14	22	Emb. 2,408	Limestone	Sand	Limestone	Same	100	28,453 57	9,516
370	Minetto	Oswego	9, 18, '06	0.48	16	26	4,479	Fieldstone	Sand	Trap-rock	Limestone	100	6,750 00	14,063
371	Clinton Street, Sec. 1	Erie	7, 18, '06	5.65	16	24–28	1,693	Limestone	Sand	Limestone	Same	98	....	....
372	Clinton Street, Sec. 2	Erie	7, 18, '06	6.14	16	24–28	2,007	Limestone	Sand	Limestone	Same	40	....	....
373	Goodrich Road	Erie	7, 9, '06	8.77	12, 16	16–32	3,130	Limestone	Sand	Limestone	Same	84	....	....
374	Maine	Broome	7, 12, '06	3.37	12	20–26–28	2,801	Fieldstone	Sand	Fieldstone	Same	98	....	....
375	Barker	Broome	7, 12, '06	0.62	16	28	Emb. 3,282	Fieldstone	Sand	Trap-rock	Limestone	100	6,367 43	10,270
376	Gloversville–Bull Run	Fulton	9, 3, '07	2.38	12	....	....	Approved st.	Sand	Approved st.	Same	100	23,588 24	9,911
377	Cincinnatus	Cortland	7, 10, '06	0.42	16	26	Emb. 1,571	Limestone	Sand	Limestone	Same	100	4,000 00	9,524
378	McGrawville	Cortland	7, 10, '06	2.92	12, 16	24, 26	Emb. 2,203	Fieldstone	Sand	Limestone	Same	91	....	....
379	Harford	Cortland	9, 19, '06	0.91	12	26	1,648	Fieldstone	Sand	Limestone	Same	92	....	....
380	State Road–Homer	Cortland	11, 14, '06	4.39	12	24	Emb. 2,825	Fieldstone	Sand	Limestone	Same	96	....	....
381	State Road–Scott	Cortland	9, 20, '07	2.72	12–16	24–26	1,728						....	....
382	Walden–Pine Bush	Orange	12, 18, '07	6.57	....	....	....	Approved st.	Sand	Trap-rock	Same	100	58,851 06	8,958
383	Owasco	Cayuga	7, 10, '06	2.19	16	24–26	Emb. 1,336	Limestone	Sand	Limestone	Same	100	19,224 08	8,778
384	Fleming	Cayuga	11, 10, '06	3.17	12	24–26–28	2,366	Limestone	Sand	Limestone	Same	97	....	....
385	Albany–Schenectady, Sec. 2	Albany	9, 3, '07	5.14	16	....	....	Gr tr-ro gn	Same	Gr tr-ro gn	Same	100	54,112 26	10,528
386	Five Cor.–Kuckville, Sec. 1	Orleans	8, 31, '06	3.47	12	28–32	1,288	Lo fld	Sand	Lo fld	Same	100	20,159 91	5,810
387	Five Cor.–Kuckvile, Sec. 2	Orleans	8, 31, '06	5.80	12–16	16–32	2,138	Lo fld	Sand	Lo fld	Same	86	....	....
388	Kendall's Corners	Orleans	7, 9, '06	3.43	12–16	26–32	2,344	Lo fld	Sand	Local gran	Same	100	23,328 73	6,801
389	Maple Ridge, Sec. 1	Orleans	9, 27, '07	3.08	12	24–32	2,345	Local stone	Sand	Limestone	Same	50	....	....
390	Maple Ridge, Sec. 2	Orleans	9, 27, '07	2.80	12	24–32	2,214	Local stone	Sand	Limestone	Same	50	....	....
391	Clarendon–Holley	Orleans	12, 4, '07	4.54	12	....	2,740	Local stone	Sand	Limestone	Same	83	....	....
398	County Line	Monroe–Orl's	1, 18, '08	5.53	12		2,027	Local stone	Sand	Local stone	Same		....	....
399	Latta	Monroe	9, 19, '07	6.84	16	26–32	1,976	Slag or lo fld	Sand	Limestone	Same	95	....	....
400	Portland Ave., Sec. 2	Monroe	9, 24, '07	0.93	16	22–32	1,586	Local stone	Sand	Limestone	Same	100	7,849 10	8,440
401	Rapids–Rochester	Monroe	12, 3, '07	1.90	16	....	....	....	....	....	....	100	28,521 19	15,011
402	Buffalo, Sec. 3	Monroe	12, 4, '07	3.62	16	....	....	....	....	....	....	99	....	....
403	Churchville–Riga	Monroe	11, 26, '07	2.08	14	....	....	....	....	....	....	26	....	....
405	Kitchawan–Croton Lake	Westchester	9, 3, '07	2.25	14	....	....	Approved st.	Sand	Trap-rock	Same	100	15,732 20	6,992

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	Materials. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Materials. Bottom. Kind of screenings or sand as filler.	Materials. Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Materials. Top. Kind of screenings or sand as filler.	Per cent completed.	Total Cost Completed. Whole.	Total Cost Completed. Per mile.
					Feet.	Feet.								
406	Augusta Road–Vernon Center	Oneida	11, 27, '06	3.88	14	24	Emb. 1,959			Limestone		100	$35,930 48	$9,260
407	Troy-Schenectady, Sec. 2	Schenectady	9, 4, '07	3.025	16			Gr tr-ro gn	Same	Gr tr-ro gn	Same	100	35,640 72	11,782
408	Rich's Dugway–Penfield	Monroe	11, 26, '07	2.43	14–15–16							100	24,666 50	10,151
411	West Point–Cornwall	Orange	12, 2, '07	2.31	14							1		
417	Glens Falls–Lake George	Warren	7, 10, '06	7.56	16	24–26	2,543	Local stone	Sand	Trap-rock	Same	100	77,448 25	10,244
418	Lake George–Bolton Landing	Warren	7, 10, '06	9.74	16	26	3,387	Local stone	Sand	Local stone	Same	100	103,871 00	10,664
420	Vestal	Broome	7, 12, '06	3.69	12–16	25	Emb. 3,008	Approved st.	Sand	Trap-rock	Same	40		
421	Conklin	Broome	12, 2, '07	7.83	14			Approved st.	Sand	Trap-rock	Same	89		
423	Watertown–Theresa, Sec. 3	Jefferson	9, 20, '07	4.19	12–16	22–26–28	1,420	Limestone	Sand	Limestone	Same	5		
424	Belleville–Adams, Sec. 1	Jefferson	11, 16, '06	1.60	12	26	Emb. 2,091	Limestone	Sand	Limestone	Same	100	11,011 31	6,882
425	Adams-Watertown, Sec. 2	Jefferson	7, 3, '06	3.16	12–16	24–26	3,513	Limestone	Sand	Limestone	Same	100	23,701 70	7,501
426	State, Sec. 2	Jefferson	3, 23, '08	4.05	12			Local stone	Sand	Local stone	Same	84		
427	Watertown–Carthage, Sec. 2	Jefferson	7, 7, '06	5.47	12–16	22–24–26	Emb. 6,857	Limestone	Sand	Limestone	Same	100	42,184 15	7,712
428	Watertown–Carthage, Sec. 3	Jefferson	12, 18, '07	4.88	12			Local stone	Sand	Local stone	Same	75		
429	Thompson	Onondaga	7, 9, '06	2.83	12	24	Emb. 3,021	Limestone	Sand	Limestone	Same	100	21,929 97	7,749
430	Jordan Valley, Sec. 1	Onondaga	7, 20, '06	1.72	12	24	Emb. 2,600	Fieldstone	Sand	Limestone	Same	100	15,094 21	8,776
431	Skaneateles–Spafford	Onondaga	7, 20, '06	2.50	12	22–24	Emb. 4,428	Fieldstone	Sand	Limestone	Same	97		
432	Rhinebeck–Hyde Park	Dutchess	8, 31, '06	3.26	16	26–30	6,009	Local stone	Sand	Local stone	Same	100	33,085 40	10,149
433	Chazy–Chazy L'dg–Ober's Cors.	Clinton	9, 1, '06	4.60	14	26	2,323	Local stone	Sand	Local stone	Same	100	34,913 65	7,590
434	Arrandale–Bay View	Nassau	7, 10, '06	1.69	12	26	1,459	Local stone	Sand	Trap-rock	Same	100	16,323 58	9,659
435	South Glenwood–Meeting House	Nassau	9, 1, '06	1.94	12, 16	24–26	2,754	Local stone	Sand	Trap-rock	Same	100	22,357 96	11,525
436	Jericho Turnpike–Plainview	Nassau	9, 1, '06	6.98	12	26–28	2,400	Local stone	Sand	Trap-rock	Same	100	82,038 96	11,753
437	Jerusalem Ave.–Front St.	Nassau	9, 4, '07	7.09	14			Trap-rock	Sand	Trap-rock	Same	100	74,592 64	10,521

438	8, 29, '06	7.10	14, 16	24-26	Emb. 1,746	Limestone.	Sand	Limestone	Same	95	...	...
439	9, 4, '07	3.78	12	...	...	Approved st	Sand	Approved st	Same	100	39,146 67	10,356
441	8, 31, '06	5 32	14	24-26	2,550	Local stone	Sand	Local stone	Same	100	69,380 32	7,490
442	9, 4, '07	6.14	12	...	...	Approved st	Sand	Trap-rock	Same	52	...	...
443	9, 4, '07	5 28	14	...	...	Approved st	Sand	Trap-rock	Same	100	51,968 77	8,278
445	12, 20, '07	2.70	12	...	...	Local stone.	Sand	Trap-rock	Same	90	...	...
446	7, 10, '06	1.35	16	26	1,926	Fieldstone	Sand	Limestone	Same	100	10,902 31	8,066
450	9, 20, '07	1 92	12-16	26	1,875	...	...	...	...	...	...	...
451	1, 14, '06	1 60	12	...	...	...	...	...	...	...	...	...
452	7, 9, '06	3 53	16	26	Emb. 1,848	Lo quarry st.	Sand	Lo quarry st	Same	27	...	...
453	7, 10, '06	4.00	16	26-28-32	2,608	Local stone	Sand	Local stone	Same	100	42,923 69	10,731
454	8, 30, '06	3 66	16	24-26-28	3,033	Fieldstone	Sand	Limestone	Same	100	33,216 15	9,075
455	8, 30, '06	0 34	12	28	Emb. 5,809	Local stone	Sand	Limestone	Same	34	...	...
456	7, 19, '06	5 39	16	26	4,991	Trap-rock	Sand	Gneiss	Same	100	30,307 02	5,628
457	7, 9, '06	5 32	16	26	5,781	Local stone	Sand	Trap-rock	Same	100	59,400 25	11,166
458	7, 10, '06	3 69	16	26	3,992	Local stone	Sand	Trap-rock	Same	100	33,293 62	9,028
459	7, 9, '06	5 53	16	26	3,336	Local stone	Sand	Trap-rock	Same	100	56,201 90	10,163
460	7, 10, '06	6.30	12, 14, 15, 16 ...	24	3,407	Local stone	Sand	Local stone	Same	100	82,504 61	13,096
461	10, 22, '07	6 07	14, 16	24-30	3,655	Approved st	Same	Trap rock	Same / Limestone	100	67,295 81	11,103
462	12, 2, '07	10 34	12	...	...	Local stone	Sand	Local stone	Same	19	...	...
474	11, 26, '07	1 95	16	...	...	...	...	...	...	95	...	...
475	9, 8, '06	2 42	16	26	5,744	Limestone	Sand	Limestone	Same	100	23,848 45	11,921
476	8, 31, '06	5 38	14, 20	24	2,731	Local stone	Sand	Local stone	Same	100	52,379 75	9,717
477	11, 18, '07	6 47	14, 16	24-26	4,807	Trap-rock	Sand	Trap-rock	Same / Limestone	100	48,929 46	7,563
478	11, 26, '07	3 21	14	25-30	2,149	Local stone	Sand	Limestone	Same	100	26,958 21	8,396
479	11, 26, '07	0 27	16	...	...	...	...	...	...	100	3,427 22	12,693
482	7, 11, '06	2 23	16	32	3,260	Limestone	Sand	Limestone	Same	100	25,000 00	11,311
483	8, 30, '06	4 44	12, 16	22-26	Emb. 2,360	Fieldstone	Sand	Limestone	Same	50		
484	7, 9, '06	6 79	12	22-32	2,578	Li or lo stone	Sand	Limestone	Same	100	48,675 45	7,198
485	1, 20, '06	3 76	12	...	...	...	...	...	...	91	...	...
486	11, 10, '06	3 37	12-16	26-30	2,369	Fieldstone.	Sand	Limestone	Same	96	...	...
487	11, 10, '06	3 66	12-16	24-26-22	3,415	Limestone	Sand	Limestone	Same	75	...	...
488	10, 18, '07	2 07	12			Limestone	Sand	Limestone	Same	67	...	...
490	11, 26, '07	6 35	16	22-24	2,126	Gravel	Sand	Gravel	Same	100	24,424 66	3,846
503	10, 16, '07	7 32	16, 20, 22	26-32	1,591	Approved st	Sand	Trap-rock	Same	100	85,852 35	11,728
505	11, 10, '06	4 60	12-16	20-22-24	2,626	Limestone	Sand	Limestone	Same	100	40,969 85	8,906
506	7, 6, '06	2 18	12	20-26-30	5,000	Limestone	Sand	Limestone	Same	100	18,727 49	8,601
507	7, 9, '06	4.68	16	32	2,628	Limestone	Sand	Limestone.	Same	100	39,981 75	8,543

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Continued).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Bottom. Kind of screenings or sand as filler.	Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Top. Kind of screenings or sand as filler.	Per cent completed.	TOTAL COST COMPLETED. Whole.	Per mile.
					Feet.	Feet.								
508	Selkirk-Coeymans	Albany	9, 4, '07	4.77	14			Approved st	Sand	Trap-rock	Same	100	$35,324 35	$7,403
509	Oswego-Mexico, Sec. 1	Oswego	7, 6, '06	5.40	16	22, 24, 26	Emb. 2,309	Fieldstone	Sand	Local sand	Limestone	100	44,853 81	8,306
510	Homer-Tully, Sec. 1	Cortland	7, 10, '06	4.17	12	26	Emb. 1,685	Fieldstone	Sand	Limestone	Same	92		
519	Mt. Kisco-Pleasantville	Westchester	9, 4, '07	3.92	14			Approved st	Sand	Approved st	Same	100	38,402 95	9,797
520	Pleasantville-Pocantico Hills	Westchester	9, 4, '07	3.55	14			Approved st	Sand	Approved st	Same	100	33,062 94	9,314
521	Massena-Waddington, Secs. 1, 2, 3, 4	St. Lawrence	9, 20, '07	8.62	12	26	2,144	Local stone	Sand	Local stone	Same	53		
522	Clarence-Hunt's Corners	Erie	6, 30, '06	4.75	12	22-32	2,408	Limestone	Sand	Limestone	Same	100	39,122 89	8,234
523	Hamburg-North Collins	Erie	7, 9, '06	8.86	16	16-32	3,799	Limestone	Sand	Limestone	Same	83		
524	North Collins-Lawton	Erie	9, 17, '07	5.43	16	32	2,871	Limestone	Sand	Limestone	Same	93		
525	Lawton-Gowanda	Erie	9, 20, '07	4.00	16	22-32	5,308	Limestone	Sand	Limestone	Same	69		
526	Collins-Morton's Cor., Sec. 1	Erie	9, 20, '07	4.01	12	32	2,640	Limestone	Sand	Limestone	Same			
527	Hamburg-Springfield, Sec. 1	Erie	9, 20, '07	9.47	12	22-32	2,880	Gravel	Gravel	Limestone	Same			
528	Hamburg-Springfield, Sec. 2	Erie	9, 20, '07	7.34	12	22-32	3,583	Gravel	Gravel	Limestone	Same	22		
529	Alden-Town Line, Clinton street-Marilla	Erie	9, 20, '07	6.02	12-16	32	2,355	Limestone	Sand	Limestone	Same	65		
530	Base Line-Grand Island, Sec. 1	Erie	9, 20, '07	1.81	16	32	1,143	Limestone	Sand	Limestone	Same	91		
531	Base Line-Grand Island, Sec. 2	Erie	12, 18, '07	2.59	14							51		
532	Base Line-Grand Island, Sec. 3	Erie	12, 18, '07	1.87	12							91		
533	West Chazy-Chazy	Clinton	9, 5, '07	6.34	14			Approved st	Sand	Approved st	Same Limestone	100	54,111 91	8,535
534	North East Center-Sharon Sta.	Dutchess	7, 9, '06	3.65	14	22, 24, 30	3,563	Local stone	Sand	Local stone	Same	100	34,344 54	9,409
535	Cortland-Dryden, Sec. 2	Cortland	9, 20, '07	2.70	12	26	1,963	Fieldstone	Sand	Limestone	Same	51		
537	Amenia-Wassaic	Dutchess	7, 7, '06	4.83	14	24-26	2,882	Local stone	Sand	Local stone	Same	100	38,238 11	7,917
539	Fulton-Volney	Oswego	12, 4, '07	2.09	20			Gravel	Sand	Gravel	Sand	100	15,821 63	7,570
540	Chatham-Spencertown	Columbia	7, 6, '06	4.32	14-16	20-24	4,754	Gravel	None	Gravel	None	100	21,319 44	4,935
541	Mayfield-Northville, Sec. 2	Fulton	1, 30, '08	6.79	14			Approved st	Sand	Gran or gn.	Same	15		
545	Syosset-Cold Spring Harbor	Nassau	9, 5, '07	3.22	16			Trap-rock	Sand	Trap-rock	Same	100	36,558 56	11,354

546	New Bridge	Nassau	1, 27, '08	6.025	15	....	....	Approved st.	Sand	Trap-rock	Same		100	52,552 21	8,722
549	Poughkeepsie-Pleasant Valley	Dutchess	7, 5, '06	6.93	14, 16, 20	30	2,538	Local stone	Sand	Local stone	Same		55	....	....
550	Violet Ave.-East Park	Dutchess	8, 28, '06	1.99	14	26	Emb. 2,520	Local stone	Sand	Local stone	Same		100	17,141 18	8,614
551	Fishkill-Hughsonville	Dutchess	7, 10, '06	2.91	14	26	2,611	Local stone	Sand	Local stone	Same		100	26,241 77	9,018
552	Rhinebeck-Ellisville	Dutchess	9, 5, '07	5.54	16	....	....	Approved st.	Sand	Approved st.	Same		100	51,430 50	9,283
559	Utica-Bridgewater	Oneida	9, 19, '07	9.09	16	26-30-32	2,858	Limestone	Sand	Syenite	Same		82	....	....
560	Mohawk River Road, Rome	Oneida	9, 19, '07	2.42	16	30-32	2,717	Fieldstone	Sand	Syenite	Limestone		98	....	....
561	Rome-Northwestern, Sec. 1	Oneida	1, 29, '08	4.48	16	12, 16	....	Local stone	Sand	Syenite	Same		91	....	....
562	Rome-Northwestern, Sec. 2	Oneida	1, 29, '08	3.87	16	12, 16	3,230	Local stone	Sand	Local stone	Same		4	....	....
563	Rome-Taberg	Oneida	3, 4, '08	5.11	16	12, 16	2,632	Local stone	Same	Syenite	Same		40	....	....
566	Wolf Hill-Berne	Albany	11, 21, '07	7.34	12-16	24-26	4,768	Approved st.	Sand or scre.	Approved st.	Same		100	62,259 75	8,482
567	Matteawan-Wicopee	Dutchess	9, 5, '07	4.71	14-16	....	....	Approved st.	Sand	Trap-rock	Same		100	39,700 95	8,429
568	Millbrook-Lithgow	Dutchess	12, 3, '07	4.40	14	30	3,863	Approved st.	Sand or scre.	Approved st.	Lim scre.		100	41,524 32	9,437
569	Baldwin Place-Mahopac	Putnam	7, 11, '06	5.90	14-16	26-28	3,106	Local stone	Sand	Local stone	Same		100	46,899 55	7,949
570	Carmel-Kent	Putnam	9, 5, '07	5.02	14	....	....	Approved st.	Sand	Approved st.	Same	....	....	....	....
577	Schenectady-Guilderland	Schenectady	7, 9, '06	7.10	14	26-30	3,670	Local stone	Sand	Local stone	Same		100	56,704 50	7,987
584	Skinnersville-New Home Bridge	Erie	5, 8, '08	7.96	12	....	....	Limestone	Sand	Limestone	Same		74	....	....
586	East Pembroke-Batavia	Genesee	6, 30, '06	5.58	16	32	2,909	Limestone	Sand	Limestone	Same		100	42,559 15	7,627
587	Mount Kisco-Milwood	Westchester	11, 26, '07	4.39	12	24	6,537	Approved st.	Sd or screen	Approved st.	Same		100	39,924 05	9,094
589	Nevis-Blue Store	Columbia	9, 1, '06	3.81	14	26	2,053	Local stone	Sand	Local stone	Same		100	25,482 70	6,688
590	Auburn-Seneca Falls, Sec. 1	Cayuga	11, 10, '06	7.96	12-16	24-26	Emb. 2,425	Limestone	Sand	Limestone	Same		97	....	....
591	Moravia-Niles	Cayuga	11, 15, '06	10.85	12	22-24	Emb. 2,488	Limestone	Sand	Limestone	Same		90	....	....
592	Auburn-Elbridge	Cayuga	9, 18, '06	5.61	12-16	24-26	Emb. 2,032	Limestone	Sand	Limestone	Same		98	....	....
593	Highland Lake-Tompkins Cove	Rockland	9, 13, '06	5.88	12	22	10,119	Local stone	Sand	Local stone	Same		100	144,167 28	24,518
595	Homer-Tully, Sec. 2	Cortland	12, 4, '07	5.43	12	....	....	Local stone	Sand	Local stone	Same		45	....	....
596	Norwich-South New Berlin, Sec. 1	Chenango	9, 20, '07	3.42	12	24	2,748	Local stone	Sand	Limestone	Same		78	....	....
597	Norwich-Kings Settlement	Chenango	10, 22, '07	3.55	12	....	3,197	Local stone	Sand	Limestone	Same		95	....	....
598	Norwich-Preston	Chenango	12, 14, '07	5.09	10-12	....	3,124	Local stone	Sand	Local stone	Same		65	....	....
599	Smyrna-Otselic	Chenango	2, 4, '08	6.48	10-12	....	3,410	Local stone	Sand	Limestone	Same		54	....	....
601	Olean-Allegany	Cattaraugus	9, 24, '07	3.09	16-20	24-30	2,560	Gravel	Gravel	Limestone	Same		27	....	....
606	Cayuga Heights-Hanshaw's Cors.	Tompkins	9, 20, '07	2.12	12	24	3,738	Local stone	Sand	Local stone	Same		85	....	....
607	Manchester-Clifton Springs	Ontario	12, 18, '07	4.35	12	....	2,781	Local stone	Sand	Limestone	Same		55	....	....
608	Phelps-Clifton Springs	Ontario	12, 18, '07	2.21	12	....	2,470	Local stone	Sand	Limestone	Same		80	....	....
609	Washington Hollow-Millbrook	Dutchess	12, 3, '07	1.63	14	30	3,619	Approved st.	Sd or screen	Approved st.	Same		100	14,213 67	8,720
613	Catskill-South Cairo	Greene	11, 27, '07	5.60	14-16	26, 28, 30	4,401	Approved st.	Sd or screen	Approved st.	Same Limestone		100	58,721 30	10,486
614	Auburn-Owasco	Cayuga	9, 20, '07	6.08	12	26	1,563	Local stone	Sand	Local stone	Same		56	....	....
615	New Lebanon-Brainard	Columbia	9, 5, '07	8.03	14	....	....	Approved st.	Sand	Approved st.	Same		100	54,796 55	6,824
616	Trumansburg-Ithaca	Tompkins	9, 20, '07	8.66	12	24	2,263	Local stone	Sand	Local stone	Same		75	....	....
917	Lewiston-Dickersonville	Niagara	9, 20, '07	4.80	12	32	2,787	Li or lo st.	Sd or screen	Limestone	Same		76	....	....
622	Mt. Morris-Geneseo	Livingston	9, 20, '07	5.20	14	22-32	3,830	Limestone	Sand	Limestone	Same	....	....	....	....

ROADS FOR WHICH CONTRACTS HAVE BEEN AWARDED UNDER CHAPTER 115, LAWS OF 1898, AND CHAPTER 468, LAWS OF 1906, TO OCTOBER 1, 1908 — (Concluded).

Road number.	NAME OF ROAD.	County.	Date of contract.	Length in miles.	Width of macadam.	Width of roadway.	Cubic yards excavation per mile.	MATERIALS. Bottom. (Usually 4 inches thick after rolling.) Kind of crushed rock.	Bottom. Kind of screenings or sand as filler.	Top. (Usually 2 inches thick after rolling.) Kind of crushed rock.	Top. Kind of screenings or sand as filler.	Per cent completed.	TOTAL COST COMPLETED. Whole.	Per mile.
					Feet.	Feet.								
623	Geneseo–Avon	Livingston	12, 18, '07	6.99	14	....	2,754	Limestone	Sand	Limestone	Same	42	....	....
640	Rotterdam Junction–Pattersonville	Schenectady	9, 18, '07	3.97	14–16	....	....	Approved st.	Sand	Trap-rock	Same	100	$30,582 35	$7,703
641	Schenectady–Rotterdam Junction	Schenectady	1, 29, '08	4.76	14	26	2,121	Approved st.	Sd or screen.	Limestone	Same	100	35,511 04	7,460
643	North Tonawanda–Sanborn	Niagara	12, 18, '07	4.44	12	....	1,710	Limestone	Sand	Limestone	Same	69	....	....
649	Stottville	Columbia	12, 18, '07	1.02	16	....	....	Approved st	Sd or screen.	Trap-rock	Same	100	13,676 76	13,409
651	Clintonville–Keeseville	Clinton	12, 4, '07	5.59	14–15	18, 28	4,400	Approved st.	Sd or screen.	Approved st.	Limestone	100	55,929 96	10,005
653	Granby	Oswego	12, 18, '07	5.06	16	....	2,390	Local stone	Sand	Syenite	Same	64	....	....
655	Sandy Hill–Glens Falls	Warren	9, 5, '07	2.12	16	32	2,030	Approved st.	Sand	Approved st.	Same	100	19,476 34	9,187
657	Croton River–Peekskill	Westchester	11, 26, '07	6.01	16	28	6,509	Approved st.	Sand	Trap-rock	Same	100	71,017 61	11,817
658	County Line–Aiden Lair	Essex	5, 21, '08	3.64	12	24, 26	5,522	Approved st.	Sd or screen.	Approved st.	Same	100	41,150 54	11,305
660½	Griswold Street–Bratt's Bridge	Niagara	12, 18, '07	5.98	12	....	1,630	Limestone	Sand	Limestone	Same	23	....	....
674	Milford Center–Milford	Otsego	11, 27, '07	6.52	14	....	4,880	Approved st.	Sand	Trap-rock	Same	51	....	....
675	Otego–Oneonta	Otsego	11, 27, '07	3.99	16	20, 22, 24, 26, 30	2,740	Approved st.	Sand	Trap-rock	Same	28	....	....
676	Otego–Wilsey's Corners	Otsego	11, 27, '07	2.05	14			Approved st.	Sand	Trap-rock	Same	100	17,665 93	8,618
677	Edmeston–West Burlington–Kelsey Corner	Otsego	2, 4, '08	4.00	14, 16	....	5,875	Approved st.	Sd or screen.	Trap-rock	Same	40	....	....
678	Morris–Gilbertsville	Otsego	12, 4, '07	2.64	16	28	4,458	Approved st.	Sd or screen.	Approved st.	Same	100	24,811 99	9,398
684	Cato–Meridian–Baldwinsville	Cayuga	12, 18, '07	4.40	12	....	4,160	Local stone	Sand	Syenite	Same	68	....	....
689	Spring Valley–Knapp's Corners	Rockland	1, 30, '08	3.57	16	28	4,789	Approved st.	Sd or screen.	Trap-rock	Same	100	34,842 65	9,760
691	Riverside–Chestertown	Warren	1, 29, '08	5.75	12	26	5,688	Approved st.	Sd or screen.	Approved st.	Same	100	52,337 11	9,102
692	Loon Lake–Pottersville–Taylors	Warren	1, 30, '08	8.94	12	26	6,152	Approved st	Sd or screen.	Approved st.	Same	100	85,547 05	9,569
693	Amityville–Babylon	Suffolk	1, 30, '08	3.82	14	28	1,597	Approved st.	Sd or screen.	Trap-rock	Same	100	33,970 60	8,893
694	Quogue–Riverhead	Suffolk	1, 28, '08	7.69	16	30	2,862	Approved st.	Sd or screen.	Trap-rock	Same	100	73,886 52	9,608
695	Otto–Cattaragus	Cattaraugus	2, 2, '08	1.21	12	....	6,368	Local stone	Sand	Granite	Same	76	....	....
696	Otto–East Otto, Sec. 1	Cattaraugus	2, 11, '08	4.10	12	....	3,682	Local stone	Sand	Granite	Same	5	....	....
697	Otto–East Otto, Sec. 2	Cattaraugus	2, 11, '08	2.37	12	....	3,000	Local stone	Sand	Granite	Same	66	....	....
698	Falconer–Kennedy	Chautauqua	2, 5, '08	1.044	12	....	1,590	Limestone	Sand	Limestone	Same	53	....	....

699	Liberty–Jeffersonville, Sec. 1	Sullivan	2, 11, '08	6.57	14	28	5,830	Approved st.	Sd or screen.	Approved st.	Same		100	63,119 96	9,607
700	Liberty–Jeffersonville, Sec. 2	Sullivan	1, 30, '06	5.15	14, 16	28, 32	5,049	Approved st.	Sd or screen.	Approved st.	Same		100	43,182 25	8,375
701	Malone–Bangor	Franklin	2, 4, '06	4.51	14	30	1,352	Approved st.	Sd or screen.	Approved st.	Same		100	40,843 23	9,056
702	Malone–Fort Covington, Sec. 2	Franklin	1, 27, '06	6.22	14	....	4,180	Approved st.	Sd or screen.	Approved st.	Same		21	....	....
703	Malone–Fort Covington, Sec. 3	Franklin	1, 27, '06	4.19	14	....	3,126	Approved st.	Sd or screen.	Approved st.	Same		100	35,252 86	8,414
719	Greenville–Coxsackie, Sec. 2	Greene	2, 11, '06	5.56	14, 16	....	3,710	Approved st.	Sd or screen.	Approved st.	Limestone		66	....	....
720	Sandy Hill–Adamsville	Washington	2, 5, '06	5.20	14	26	2,000	Approved st.	Sd or screen.	Approved st.	Same		100	46,337 30	8,911
721	White Creek–County Line	Washington	1, 29, '06	3.17	14	26	5,394	Approved st.	Sd or screen.	Approved st.	Limestone		100	25,607 04	8,078
722	Hebron Town Line–Granville	Washington	2, 3, '06	2.06	14	26	3,107	Approved st.	Sd or screen.	Approved st.	Same		100	19,442 92	9,438
726	Chittenango–Oneida, Sec. 2	Madison	2, 11, '06	7.53	12, 16	....	1,600	Limestone	Sand	Syenite	Same		69	....	....
730	Portville–Olean, Sec. 1	Cattaraugus	1, 3, '06	3.46	16	....	1,445	Gravel	Sand	Limestone	Same	....	..	....	....
731	Portville–Olean, Sec. 2	Cattaraugus	1, 30, '06	2.06	16	....	1,600	Gravel	Sand	Limestone	Same		28	....	....
732	Ogdensburg–Canton, Sec. 1	St. Lawrence	4, 23, '06	8.79	12	....	1,376	Limestone	Sand	Limestone	Same		45	....	....
733	Ogdensburg–Canton, Sec. 2	St. Lawrence	4, 23, '06	8.02	12	....	1,583	Gr or gn	Sand	Gr or gn	Same		46	....	....
742	Big Flats–Gibson	Steuben	1, 30, '06	4.33	16	....	2,965	Local stone	Sd or screen.	Limestone	Same		93	....	....
743	Babylon–Bay Shore	Suffolk	1, 30, '06	4.08	16	28	735	Approved st.	Sd or screen.	Trap-rock	Same		100	40,537 05	9,936
744	Port Henry–Westport	Essex	5, 18, '06	4.07	14	28	4,005	Approved st.	Sd or screen.	Approved st.	Same		100	26,729 75	6,568
745	Taylors–Schroon Village	Essex	5, 18, '06	5.46	12, 14	....	3,448	Approved st.	Sd or screen.	Approved st.	Same		3	....	....
756	Alden Lair–Newcomb, Sec. 2	Essex	5, 18, '06	7.03	12	....	5,830	Approved st.	Sd or screen.	Approved st.	Same		37	....	....
781	Gilbertsville Village	Otsego	9, 30, '06	0.80	16	26, 28	4,250	Approved st.	Sd or screen.	Approved st.	Same		100	8,865 00	11,081
782	Otego Village	Otsego	10, 22, '06	0.41	14, 16	26, 30	3,300	Approved st.	Sd or screen.	Trap-rock	Same		100	4,343 90	10,595
783	Milford Village	Otsego	10, 22, '06	0.68	14, 15, 16	26, 28, 30, 32, 34	2,500	Approved st.	Sd or screen.	Trap-rock	Same		100	6,547 67	9,629

REPORT

OF THE

DIVISION ENGINEER

OF THE

EASTERN DIVISION

For the Fiscal Year Ended September 30, 1908

EASTERN DIVISION.

State of New York,
Department of State Engineer and Surveyor,
Eastern Division.

Albany, *October* 1, 1908.

Hon. Frederick Skene, *State Engineer and Surveyor:*

Sir.—I have the honor of submitting herewith my annual report as Division Engineer of the Eastern Division of your Department for the fiscal year ending September 30, 1908.

The chief work of this Division has consisted in performing the necessary engineering work in connection with the present canal system and making surveys, plans and supervising construction of the new Barge canal; also making surveys, plans and supervising improvement of highways under chapter 115, Laws of 1898.

For canal purposes the Eastern Division comprises that part of the canal system of the State extending from the Hudson river at Albany to the east line of Oneida county, and from the junction of the Erie and Champlain canals, about a mile north of Watervliet, to the south end of Lake Champlain, covering a total of 188.36 miles of navigable waters.

For highway improvement purposes there are included in the Eastern Division the counties of Albany, Clinton, Columbia, Delaware, Dutchess, Essex, Franklin, Fulton, Greene, Hamilton, Herkimer, Montgomery, Nassau, Orange, Otsego, Putnam, Rensselaer, Rockland, Saratoga, Schenectady, Schoharie, Suffolk, Sullivan, Ulster, Warren, Washington and Westchester, with a total highway mileage of 31,538 miles.

Coöperation has been extended and assistance given to the Department of Public Works in making surveys, plans and estimates whenever it has been requested. Surveys have been made and testimony given on behalf of the State in the Court of Claims in suits brought against the State for damage resulting from leaks and breaks in the canal.

BARGE CANAL.

(Chapter 147, Laws of 1903.)

For the purpose of Barge canal work the Eastern Division has been divided into the following residencies:

Erie canal, Residency No. 1. From the Congress street bridge crossing the Hudson river at Troy to the west end of the lower Mohawk aqueduct at Crescent, including that portion of the Hudson river which is common to the main line of the canal and of the Champlain canal.

Erie Canal, Residency No. 2. From the west end of the lower Mohawk aqueduct at Crescent, to the head of old lock No. 27, situated about three-fourths of a mile west of Cranesville, Montgomery county.

Erie canal, Residency No. 3. From the head of old lock No. 27 to the head of old lock No. 34 at Mindenville, Montgomery county.

Erie canal, Residency No. 4. From the head of lock No. 34 to the easterly line of Oneida county, which is also the east line of the city of Utica.

Champlain canal, Residency No. 1. From the junction of the Barge canal and Champlain canal, in the Hudson river east of Waterford, to the foot of old lock No. 10, near Northumberland dam, Washington county.

Champlain canal, Residency No. 2. From the foot of lock No. 10, near Northumberland dam, Washington county, to the highway crossing the present Champlain canal at Dunhams Basin, Washington county, including the Glens Falls feeder, dam and pond above.

Champlain canal, Residency No. 3. From the highway crossing the present Champlain canal at Dunhams Basin, Washington county, to Lake Champlain.

Aside from the work performed at the head office under the Special Deputy State Engineer, an account of what has been done on the Eastern Division in constructing the Barge canal will be found in the following reports of the Resident Engineers, describing the work of their respective residencies:

Barge Canal, Contract No. 2.
Lock No. 2, at Waterford, built within coffer-dams, one wall completed, the other wall in progress.

Barge Canal, Contract No. 2.
Coffer-dam for lower portion of north lock wall, lock No. 2, at Waterford.

ERIE CANAL, RESIDENCY No. 1.

Resident Engineer C. Arthur Poole reports:

"This residency extends from the Congress street bridge at Troy to the lower Mohawk aqueduct at Crescent. During the year the work on this residency has consisted almost entirely of construction with the exception of some preliminary surveys in the Hudson river between Waterford and the State dam at Troy, and some appropriation surveys for the Crescent-Middletown highway in the vicinity of Crescent. The portion of the residency under construction is included in contracts Nos. 2 and 11, and bridge contracts Nos. 7 and 34, a report on each of which is given below. Dam No. 2, known as the 'Crescent dam,' is also on this residency, but is included in contract No. 14, a report on which is given under Residency No. 2.

"*Contract No.* 2. Work on this contract continued during the year with the exception of the months of February and March, during which no work was done. About 32 per cent of the entire work was completed during the fiscal year, making a total of 67 per cent completed to date. The excavation at lock No. 2 was completed for the breast wall and both side walls, and the excavation in the prism above lock No. 3 was practically completed, this work being done with a steam-shovel. About 15 per cent of the total amount of the excavation has been done during the year, making a total of 72 per cent completed. About one-half of the material excavated has been placed in embankment; most of this was placed in rear of the walls of lock No. 3 and around the core-walls. Some embankment was placed on the south side of lock No. 2 and some in rear of the north retaining wall between locks Nos. 2 and 3. About 40 per cent of the total embankment has been made during the year, making a total of 53 per cent completed.

"Concrete work was continued during the fall of 1907 on locks Nos. 2 and 3, until the middle of January, when it was suspended for the winter. Work was resumed the first of April, and has been carried on continuously since. For a few weeks in the spring the concrete was hand-mixed; the remainder of the time the concrete plant with the Hains mixer was used. The core-walls and spillway of lock No. 3 were completed during the year.

Lock No. 3 is about 94 per cent completed and lock No. 2 is completed except the floor and the lower end of the north wall, or about 67 per cent. The west wing of the north abutment of the Fourth street bridge was built during the year, and the abutments of the Saratoga avenue bridge were changed to fit the new location of the bridge:

"The other items of work on the contract completed to date are incorporated in the construction of the locks, the progress depending upon the amount of concrete placed in the locks.

"The following table gives the summary of work done during the year and the total completed to date:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing	Lump sum.	0	90%	0	90
Grubbing cu. yds	1,200	0	135	0	11
All excavation cu. yds.	584,809	88,936	425,436	15	73
Sheeting and bracing ft. B. M.	50,000	0	23,600	0	47
Forming embankment cu. yds	110,410	44,370	58,420	40	53
Foundation piles, 15 ft. and 20 ft. long No.	2,130	0	1,485	0	70
25 ft. long No.	100	0	3	0	3
Second-class concrete cu. yds.	95,664	42,270	70,730	44	74
Third-class concrete cu. yds.	500	0	414	0	83
First-class masonry coping cu. yds.	7	3.9	6.9	Finished.	Finished.
Cast iron pipe and specials lbs.	15,000	14,273	14,273	Finished.	Finished.
Iron castings, plain lbs.	232,900	85,379	193,613	37	83
Iron casting, machined lbs.	58,000	29,233	55,655	50	96
Steel castings lbs.	15,000	6,983	10,603	47	71
Structural steel lbs.	106,348	46,515	48,455	44	46
White oak miter-sill ft. B. M.	6,000	2,840	2,840	47	47
30-in. sluice-gate, including operating stand	Lump sum.	100%	100%	100	100
Additional bailing and draining, Lock No. 2	Lump sum.	53%	63%	53	63
Additional bailing and draining, Lock No. 3	Lump sum.	0	90%	0	90
Additional lumber and labor, concrete forms	Lump sum.	58%	78%	58	78
Materials finishing concrete	Lump sum.	50%	70%	50	70
Fender fastenings No.	860	310	367	36	43
Removing concrete cu. ft.	600	332	332	55	55
Dressing surface sq. ft.	380	206	206	54	54
Cast iron quoin-plates lbs.	30,000	12,610	12,610	42	42

"*Contract No.* 11. The excavation work on this contract has been carried on during the entire year. The two steam-shovels continued work in the big cut above lock No. 6 until April, when one shovel was moved to lower end of contract to begin the excavation for lock No. 4, while the other shovel continued work in the cut. The excavation in this cut is about 77 per cent completed, 171,000 cubic yards having been removed during the year. All the material excavated has been placed in spoil banks. The channeling in this cut was started November 1 and has been carried on continuously since. About 37 per cent of the total

Barge Canal, Contract No. 2.
By-pass spillway at lock No. 3, near Waterford.

amount has been channeled to date. The excavation for lock No. 4 was started in April of this year. The progress has been very slow, due to the soft character of the material and the difficulty of placing this material in embankment properly. This has caused a considerable delay in the concrete work, as the excavation was not ready when the concrete plant could have been utilized to place concrete in this locality. About 45,000 cubic yards have been removed from the site of lock No. 4 and the lower approach to same. The excavation for the lock itself is now nearly completed. All the material excavated here was placed in embankment around the south core-wall of lock No. 4. This embankment is about 75 per cent completed.

" Concrete work was continued during the fall of 1907 on lock No. 5 until December 1, when the concrete plant was shut down for the winter. Work was resumed the first of April and has been carried on continuously since. Lock No. 5 and core-walls were completed with the exception of about 600 cubic yards in the floor of the lock. A small amount of concrete was placed in the foundations of the concrete docking piers between locks Nos. 4 and 5. Work was continued on the south core-wall of lock No. 4, which is now about 91 per cent completed. The north core-wall of lock No. 4 was started in May and about 68 per cent of the total amount of concrete has been placed to date. Concrete work was started in lock No. 4, September 12, and only a small quantity has been placed to date.

" The other items of work on the contract completed to date are incorporated in the construction of the locks, the progress depending upon the amount of concrete placed in the locks.

" The following table gives the summary of work done during the year and tho total completed to date:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing	Lump sum.	0	90	0	90.0
Grubbing ... cu. yds.	15,000	0	8,094	0	54.0
All excavation ... cu. yds.	799,100	229,345	395,580	28.7	49.5
Sheet and bracing ... ft. B. M.	200,000	24,783	201,968	12.4	100.0
Rock channeling ... sq. ft.	96,000	35,512	35,512	37.0	37.0
Forming embankment, first-class ... cu. yds.	116,300	24,131	35,495	20.7	30.5
Forming embankment, second-class ... cu. yds.	275,000	20,336	63,586	7.4	23.1
Lining ... cu. yds.	6,290	0	2,243	0	35.7
White oak ... ft. B. M.	9,600	1,410	2,820	14.7	29.4
Foundation piles, 15 ft. long ... No.	89	25	75	28.1	Finished.
Foundation piles, 20 ft. long ... No.	261	0	258	Finished.	Finished.
Concrete ... cu. yds.	160,850	33,484	43,644	20.8	27.1
Steel castings ... lbs.	20,000	6,310	6,310	31.5	31.5
Iron castings, plain ... lbs.	378,100	6,156	98,062	1.6	25.9
Iron castings, machined ... lbs.	90,100	0	27,984	0	31.1
Structural steel ... lbs.	115,200	7,025	9,832	6.1	8.5
Metal reinforcement ... lbs.	428,600	256	1,206	0.1	0.3
Cast iron quoin-plates ... lbs.	46,000	15,879	15,879	34.5	34.5
Removing concrete ... cu. ft.	216	188	188	Finished.	Finished.
Dressing concrete ... sq. ft.	100	91	91	Finished.	Finished.

"*Contract No.* 7. This contract provides for the erection of several bridges over the proposed Barge canal in various localities in the state, and among the number is the Fourth street bridge at Waterford, which is located on this residency. The contract calls for the furnishing and erecting of the superstructure only. Work was continued on this bridge during the fall of 1907 and all the steel work, the concrete floor in the roadway and paving were completed in December, when work was suspended. The concrete sidewalks and part of the hand railing on the approaches were placed in May of this year. The bridge is completed with the exception of the hand railing on the east wing of the north abutment, which wing has not been built yet. The bridge has been open to traffic since February 14, 1908.

"*Contract No.* 34. This contract provides for the furnishing and erecting of a highway bridge superstructure over the canal at Saratoga avenue, Waterford. The progress on this bridge has been very slow. On October 1, 1907, the steel work was all in place and the riveting about 65 per cent completed. The riveting and painting of the bridge was continued during the fall and was not completed until February 20. During the latter part of February and the first part of March the bridge was moved 16 feet and 3 inches to the east to conform better with the alignment of the adjoining streets. This change was provided for in alteration No. 1. The forms for the concrete floor of the bridge

were started in April and it was July 11 before the concrete for the roadway floor was completed, and August 31 when the sidewalks were completed. The paving was completed September 7, and the bridge was opened to traffic September 17. This contract is now complete with the exception of a small amount of painting on the lower chord.

"*Surveys.* During the months of February and March a party was in the field making a preliminary survey along the Hudson river between the State dam at Troy and Waterford. A base line was run from the south end of contract No. 2 to the Troy dam. Levels were run over the base line and bench marks established. Soundings were taken at the proposed site of the lock on the west side of the river every ten feet for 150 feet above the present dam. Soundings were also taken in the river from the Twelfth street bridge, Lansingburg, to the south end of a previous survey made in connection with contract No. 2.

"A party was also in the field for a short time in January making appropriation surveys for a relocation of the Crescent-Middletown highway, on contract No. 14.

"Other parties have been engaged from time to time on work in connection with the Department of Public Works, making several appropriation surveys and taking measurement of some of the old locks on the Erie canal for dressing and repointing the lock walls.

"*The office work* on this residency has consisted of the checking of estimates, preparation of reports and correspondence in connection with the construction work; also the computation of coördinates and field notes for the survey party on Residency No. 2, and the plotting of appropriation maps on Residency No. 2.

"*Surveys.* Work has been continued during the year by the party in the field making surveys for land to be appropriated along the Mohawk river in the territory covered by contract No. 14. These surveys are of land that will be flooded, due to raising the water-surface by the construction of dams Nos. 2 and 3. The work consists in staking out and locating the low-water flow line, the maximum navigable flood line and the maximum flood line, and locating the intersecting property lines, buildings and other topography. The locating of the property lines and the descriptions of

Contracts have been awarded under Chapter 115, Laws of 1898, and Chapter 468, 1906 to October 1, 1908 — (Continued).

Total Cost Completed

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same has occasioned a considerable amount of work in searching the records in the various county clerk's offices. During the past year the following territory has been covered:

"On the south shore from a point about one-half mile east of Niskayuna to about 4,000 feet below the site of dam No. 3, and from 6,000 feet above the site of dam No. 3 to aqueduct No. 2, a total of 300 acres.

"On the north shore from the narrows above old lock No. 19 to Vischer's Ferry, and from a point about 1,000 feet east of old lock No. 20 to three-quarters of a mile east of aqueduct No. 2, a total of 75 acres.

"The following summary shows the surveys made to complete the above: 48.7 miles of circuit; 15.2 miles of property lines run out; 3.6 miles of base line rerun; 8.3 miles of red and blue line; 3.8 miles of check levels; 2.3 miles of surveys to locate county line between Albany and Schenectady counties; 4 miles of low-water line; 7.6 miles of maximum navigable flood lines and 10.7 miles maximum flood line staked out and located by stadia.

"This party has also been engaged part of the time on survey work on Residency No. 1, and in making surveys of land to be appropriated for the Department of Public Works.

"Appropriation maps have been made covering the land necessary for construction purposes on the south shore at the site of dam No. 2, the highways in the vicinity of Crescent included in contract No. 14. and the north shore and island at the site of dam No. 3.

"The surveys of land to be appropriated on Residency No. 2 are nearly completed, but there is a considerable amount of work to be done on the mapping of this work."

ERIE CANAL, RESIDENCY NO. 2.

Resident Engineer E. J. Pickwick reports:

"This residency extends from the west end of the lower Mohawk aqueduct at Crescent to the head of old lock No. 27 at Cranesville, a distance of 27.0 miles.

"The surveys for appropriated lands within this residency have been continued under the direction of Mr. C. A. Poole, Resident Engineer on Residency No. 1.

Barge Canal, Contract No. 14.
Beginning eastern section of dam at Crescent.

Barge Canal, Contract No. 14.
Eastern portion of dam at Crescent, alternate sections completed.

"The work on this residency under contract includes two fixed dams, a lock and river dredging under contract No. 14, and three movable dams and three locks under contract No. 8. A part of the dredging included in contract 20 is in this residency, but the work has not been let.

"*Contract No.* 14. At dam No. 2, Crescent, construction work began in March, 1908. A coffer-dam was built to include the west half of dam 'A' and adjacent abutment, and some work has been done on the east end of dam 'B' and adjacent abutment. About 12,400 cubic yards of earth and rock were excavated from the site of the dam and about 6,000 cubic yards of concrete were placed in the sections of the dam. The plant used consists of a 250-horse-power compressor, electrically driven, McMyler traveler, derrick boat, traveling derrick, four guy derricks, Hains concrete mixer and trains. A quarry has been opened at the site of the dam and a small crushing plant installed. On the Crescent-Middletown road the three concrete culverts are finished and the grading nearly half done. About 13,200 cubic yards of material have been excavated and about 10,000 cubic yards of embankment have been formed. The plant used is a 35-ton revolving Thew shovel and Watson wagons.

"At dam No. 3, lock No. 7, Vischer's Ferry, construction work began in October, 1907. The site of the lock and part of the lower approach were excavated first. Two coffers were built from the lock site to the island to inclose dam 'D,' and the site of this dam was excavated early in the summer. About 96,300 cubic yards of excavation and 10,100 cubic yards of embankment have been made and about 16,700 cubic yards of concrete placed in the river wall of the lock and dam 'D.' The plant used consists of two 250-horse-power compressors driven by steam, two Lidgerwood cables 1,000 feet long, four traveling derricks, derrick boat, two clam-shell derricks, Hains concrete mixer, machine shop, a steam-shovel and trains.

"The following table gives the summary of work done during the year and the total completed to date:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing	1	30%	30%	30.0	30.0
Grubbing .... cu. yds.	2,975	46.3	46.3	1.6	1.6
All excavation .... cu. yds.	810,850	121,930	121,930	15.0	15.0
First-class embankment .... cu. yds.	173,860	9,800	9,800	0.6	0.6
Second-class embankment .... cu. yds.	30,560	10,134	10,134	32.0	32.0
First-class concrete .... cu. yds.	21,000	2,286	2,286	10.9	10.9
Second-class concrete .... cu. yds.	210,590	20,593	20,593	9.8	9.8
Reinforced concrete .... cu. yds.	55	37	37	67.2	67.2
Metal reinforcement .... lbs.	135,319	3,245	3,245	2.4	2.4
Iron castings, plain .... lbs.	163,000	28,200	28,200	17.3	17.3
Iron castings, machined .... lbs.	55,000	6,860	6,860	12.4	12.4
24-inch vitrified pipe .... lin. ft.	200	181	181	90.5	90.5

NOTE.— This table covers work on that part of Contract No. 14, situated within the limits of Residency No. 2,— Sections 1 and 2.

"*Contract No.* 8. At dam No. 4, lock No. 8, Scotia, construction work is just being started. The site of the lock has been cleared and the steam-shovel and trains are being unloaded to begin excavating at the site of the lock.

"At dam No. 5, lock No. 9, Rotterdam, construction work began in September, 1907, and the work of excavating at the site of the lock and guide-wall was continued until January, 1908, except for short periods during the fall floods. Work was also started on the foundation piles for the guide-wall and land-wall of lock during this period. Work was resumed for the season of 1908 in April. About 53,800 cubic yards of earth have been taken out, about 3,660 piles driven and about 4,850 cubic yards of concrete placed in the upper guide-wall and in the land-wall of the lock. About 9.2 tons of reinforcement have been embedded in the concrete in order to carry the loads of the walls into the extended footings of the foundations. Considerable difficulty was experienced in making the excavation and in driving the piles on account of the instability of the material. Two alterations were made in the original plans to provide additional and longer piles on which to place the concrete walls. The plant used consists of a No. 60 Marion steam-shovel and trains, one traveling derrick and hoist, four guy derricks and hoists, Hains mixer, an 80-horse-power horizontal boiler and pumps, washing and screening plant.

"At dam No. 6, lock No. 10, Cranesville, construction work was discontinued in October, 1907, on account of high water and

Barge Canal, Contract No. 14.
Beginning the western portion of the dam at Vischer's Ferry.

a break in the coffer-dam. Work was resumed early in April, 1908. The washing and screening plant was overhauled and improved and a substantial coffer-dam built to inclose the entire lock and approaches. The work of driving piles and reëxcavating to grade at the lock was started in May and was immediately followed by the placing forms and concrete for the remainder of the lock. The lock is completed, except for the pier on the river wall and the lock-gates. The north abutment is about 90 per cent completed and the north shore protection is about 50 per cent completed. The following statement shows the volume of work done during the year: Excavation, 7,300 cubic yards; embankment, 7,600 cubic yards; concrete, 16,300 cubic yards; piles, 1,475; dry stone work, 2,700 cubic yards; metal work, 31,400 pounds; besides two needle-beams complete and four lock-valves. The water-bearing gravel in the foundation for the lock made it necessary to put in a drain the entire length of the foundation to take care of the boiling springs. The plant consists of two traveling derricks with hoists, four guy derricks with hoists, one derrick boat, a washing and screening plant, Hains mixer and trains. Also a small portable crusher and mixer are in use on the north shore.

"The work on this contract has been under the supervision of the following Resident Engineers during the year: C. A. Poole, until February, 1908; S. M. Savage, from February to May, 1908; and E. J. Pickwick, since May, 1908.

"The following table gives the summary of work done during the year and the total completed to date:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing	1	....	67%	0.0	67.0
Excavation cu. yds.	363,680	57,968	147,128	15.9	40.4
Sheeting and bracing ft. B. M.	100,000	9,050	15,800	9.1	15.8
Embankment cu. yds.	70,109	7,582	11,062	10.8	15.8
Foundation piles, 16 ft. long No.	3,258	16	158	0.5	4.8
Foundation piles, 18 ft. long No.	4,105	23	249	0.6	6.1
Foundation piles, 20 ft. long No.	1,100	120	124	10.9	11.3
Foundation piles, 25 ft. long No.	10,852	4,292	6,363	38.6	58.6
Foundation piles, 30 ft. long No.	350	94	262	24.2	74.8
White oak sawed lumber ft. B. M.	4,000	1,118	1,118	29.5	29.5
Wooden sheet-piling ft. B. M.	445,560	73,600	83,600	16.5	18.7
Second-class concrete cu. yds.	91,825	29,826	35,640	32.4	38.8
Third-class concrete cu. yds.	1,610	5	5	0.3	0.3
Grouted filling cu. yds.	4,200	1,289	1,468	30.6	34.9
Ballast cu. yds.	3,880	50	50	1.3	1.3
Second-class paving sq. yds.	13,800	316	316	2.3	2.3
Second-class riprap cu. yds.	6,644	117	117	1.8	1.8
Third-class riprap cu. yds.	700	222	222	31.7	31.7
Fourth-class riprap cu. yds.	10,052	725	725	7.2	7.2
Iron castings lbs.	33,000	6,030	10,691	18.3	32.4
Structural steel lbs.	3,543,000	15,062	15,436	0.39	0.4
Metal reinforcement lbs.	488,955	28,642	35,489	5.8	6.8
Upper lock-gates No.	6	9.5%	10%	9.5	10.0
Lower lock-gates No.	6	0.5%	5%	5.0	5.0
Swing beams for needle-dams No.	6	1.75	1.76	29.0	29.1
Valve-seat supports No.	12	4	5	33.3	41.7
Lock-valves No.	12	3	3	25.0	25.0
Emergency piling lin. ft.	88,650	14,106	14,106	16.0	16.0
Removing concrete cu. ft.	360	360	360	100.0	100.0

ERIE CANAL, RESIDENY NO. 3.

Resident Engineer F. P. Williams reports:

"The limits of the residency are old lock No. 27 near Cranesville, at the east end, and old lock No. 34, near Mindenville, at the western end, covering a length of 34.4 miles along the Mohawk river.

"*Surveys.* The surveys for 30 parcels of appropriated lands, contract No. 20, have been made. These parcels comprise practically all the land appropriated at stream entrances. Contract No. 20 is the contract for the dredging work in the Mohawk river; it extends across the entire length of the residency. The surveys for the construction work have been made as far as the work of the contractors has required.

"*Office work.* The deed maps and descriptions for the above parcels of appropriated lands, contract No. 20, have been practically completed, including the searches for same.

"In addition to the regular monthly estimates of construction work, a final estimate has been completed of the work on contract

View from the lock at Vischer's Ferry towards the adjacent portion of the dam being built across the Mohawk river.

No. 17 done by the Scofield Company, dated October 21, 1907, and of work on the same contract done by the Department of Public Works, dated December 23, 1907. Such plans and computations as necessary for reletting this contract have been completed.

"During the winter months, some of the lock, culvert, stream entrance and retaining dam plans for contract No. 30 were completed in this office and forwarded to the head office.

"*Contract No.* 17. Work on this contract, which includes the construction of dam No. 7 and lock No. 11 at Amsterdam, and dam No. 8 and lock No. 12 at Tribes Hill, and was let to the Scofield Company, was stopped by the contractors on October 21, 1907, who advised that they would not resume operations. On November 2, 1907, work was resumed by the Department of Public Works, and a portion of the south abutment of dam No. 7 adjacent to the present canal was completed and the storage of the plant and the protection of the work for the winter was completed on December 21, 1907.

"On March 3, 1908, the contract was relet to Alexander Murdock and active construction work was recommenced by the building of coffer-dams at dams Nos. 7 and 8, in April, 1908, and advanced steadily throughout the year, as follows:

"At dam No. 7, lock No. 11, the excavation for lock and guide-walls has been practically completed; the upper guide-wall has been about completed and the concrete work of the lock and lower guide-wall commenced; about one-half of the south span of the dam has been completed.

"At dam No. 8, lock No. 12, the upper guide-wall has been completed and about one-half of the south span of the dam and the abutment have been completed.

"For construction purposes the contractors have built two large coffer-dams at both sites. The plant at dam No. 7 includes a steam-shovel, several derricks and a complete concrete plant. At dam No. 8 the plant includes a cableway, a completed concrete plant, etc. The daily force for the entire contract, reduced to an 8-hour basis, during September, 1908, averaged about 450 men.

"The construction work at dam No. 7 is under the direction of M. E. James, Assistant Engineer; that at dam No. 8 is under the direction of Anthony E. Steere, Assistant Engineer. The season

has been notably favorable for construction work, as there have been no floods and very little lost time on account of rain.

"Besides the small amount of construction work done by the Scofield Company, and by the Department of Public Works during the latter part of last season, the following table shows a summary of the work done by Alexander Murdock during the present season:

ITEMS OF WORK.	Preliminary estimate including four alterations.	Work done during year (by Alex. Murdoch).	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing	Lump sum.	....	80%	....	80
All excavation ..... cu. yds.	185,336	35,447	76,411	19	41
Sheeting and bracing ..... ft. B. M.	60	13	18	24	30
Embankment ..... cu. yds.	33,000	1,187	2,744	4	8
Puddle ..... cu. yds.	225	34	91	15	40
Foundation piles, 15 ft ..... No.	360	174	207	48	57
Foundation piles, 16 ft ..... No.	1,100	580	652	53	59
Foundation piles, 20 ft ..... No.	500	74	342	15	69
Wooden sheet-piling ..... ft. B. M.	75	38	38	51	51
Steel sheet-piling ..... sq. ft.	700	....	573	....	82
Second-class concrete ..... cu. yds.	49,517	11,135	12,457	22	25
Third-class concrete ..... cu. yds.	1,791	318	318	18	18
Ballast ..... cu. yds.	700	191	234	27	33
Hand laid riprap ..... cu. yds.	4,200	284	1,155	7	28
First-class riprap ..... cu. yds.	4,300	211	211	5	5
Second-class riprap ..... cu. yds.	5,300	708	1,537	13	29
Fourth-class riprap ..... cu. yds.	4,200	507	1,083	12	26
Iron castings ..... lbs.	25,000	6,816	6,816	27	27
Structural steel ..... lbs.	2,504,000	327	729	....	....
Metal reinforcement ..... lbs.	148,247	38,601	40,722	26	28
Needle-dams ..... No.	4	13%	13%	3	3
Supports for valve-seats ..... No.	8	1	1	12	12

"Construction work on that portion of contract No. 14, in this residency, has been commenced this year; this is under the direction of S. M. Savage, Resident Engineer, whose report gives the details of this work.

"The residency office has been continued in the Old Guy Park House at Amsterdam, appropriated by the State for construction purposes. A small office building was constructed in the spring for the field force in charge of the construction work at Tribes Hill."

Resident Engineer S. M. Savage presents the following report of work done on that portion of contract No. 14 within residency No. 3, Erie canal:

"The basis of the award for contract No. 14 amounted to $2,935,763. Alterations Nos. 2 and 3 change the estimate for the contract to $2,947,838. The contract was awarded to Arthur W.

View of the lock under construction at V[illegible]

Luce, September 10, 1907, and by him assigned to the Acme Engineering and Contracting Company, with head offices at Schenectady. The contract was under the charge of E. J. Pickwick, Resident Engineer, until May 15, 1908, since which time the portion on residency No. 3 has been under my charge.

"On residency No. 3, the contract provides for the construction of dam No. 9 and lock No. 13 at Yosts, dam No. 10 and lock No. 14 at Canajoharie, dam No. 11 and lock No. 15 at Fort Plain and a retaining dam at Mindenville.

"*Dam No.* 9, *Lock No.* 13. Excavation began at the lock site on June 12, and the placing of concrete on September 27. The principal items of work done are: Excavation, 20,000 cubic yards — 22.5 per cent of total; concrete, 195 cubic yards — 0.9 per cent of total. Total value of work done is $16,160, representing 4.6 per cent of the probable cost of these structures.

"*Dam No.* 10, *Lock No.* 14. Contract work has not been started.

"*Dam No.* 11, *Lock No.* 15. Clearing at the lock site began January 27. Excavations for the lock began March 13, for the abutment of the dam May 29, for the apron of the dam September 18; the placing of concrete in the lock July 13, in the abutment of the dam July 21. The abutment of the dam was completed September 11. The principal items of work are: Excavation, 47,500 cubic yards — 46 per cent of total; concrete, 5,566 cubic yards — 27 per cent of total. Total value of all work done is $79,226, representing 21 per cent of the probable cost of these structures.

"*Mindenville Retaining Dam.* This is a stone-filled crib dam placed across the Mohawk river for the protection of the canal at the point where it leaves the river at the lower entrance to lock No. 16. The materials for construction began to arrive on May 22, and excavation began on June 29. At the date of this report, nearly all the excavation for the dam and south abutment is finished and that for the north abutment started; the south abutment and 250 feet of the dam are completed; and the placing of riprap on and in front of the apron is well started. The principal items of work are: Excavation, 3,900 cubic yards; sawed lumber, in cribs, 71,000 feet, B. M.; stone filling, in cribs, 1,000 cubic yards; concrete, placed, 140 cubic yards. The value of all work

done is $9,350, representing 37 per cent of the probable cost of the structure.

"The following statement shows the several items of the contract, as modified by existing alterations, and refers to that portion of contract No. 14 within residency No. 3:

ITEMS OF WORK. (Contract No. 14, Section No. 3, only).	Preliminary estimate, including all alterations.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing .... lump sum.	$50	$25	$25	$50	50
All excavation .... cu. yds.	423,575	71,374	71,374	17	17
Sheeting and bracing .... ft. B. M.	119,700	3,612	3,612	3	3
Forming embankment, first-class .... cu. yds.	65,847	446	446	1	1
Puddle .... cu. yds.	212	0	0	0	0
Sawed lumber, yellow pine and Douglas fir .... ft. B. M.	115,891	23,643	23,643	20	20
Sawed lumber, hemlock .... ft. B. M.	61,962	42,047	42,047	64	64
White oak lumber in miter-sills and gates .... ft. B. M.	35,100	0	0	0	0
Sawed lumber, white oak .... ft. B. M.	7,000	5,355	5,355	76	76
Sawed lumber, creosoted yellow pine and Douglas fir .... ft. B. M.	17,500	0	0	0	0
Stone filling in cribs .... cu. yds.	1,400	1,002.6	1,002.6	71	71
Foundation piles, 10 ft. long .... No.	70	0	0	0	0
Foundation piles, 12 ft. long .... No.	118	0	0	0	0
Foundation piles, 14 ft. long .... No.	1,500	0	0	0	0
*Foundation piles, 16 ft. long .... No.	2,562	71	71	3	3
*Foundation piles, 20 ft. long .... No.	....	79	79	100	100
*Foundation piles, 24 ft. long .... No.	....	80	80	100	100
*Foundation piles, 30 ft. long .... No.	....	1	1	100	100
Wooden sheet-piling .... ft. B. M.	224,220	0	0	0	0
Concrete, second-class .... cu. yds.	74,930	5,761.1	5,761.1	7	7
Concrete, third-class .... cu. yds.	1,280	139.3	139.3	11	11
Stone paving, second-class .... cu. yds.	3,610	0	0	0	0
Stone paving, third-class .... cu. yds.	460	0	0	0	0
Ballast .... cu. yds.	2,491	12	12	1	1
Riprap, first-class .... cu. yds.	2,847	133.1	133.1	4	4
Riprap, second-class .... cu. yds.	7,460	159.6	159.6	2	2
Riprap, third-class .... cu. yds.	903	0	0	0	0
Riprap, fourth-class .... cu. yds.	8,658	47	47	1	1
Structural steel .... lbs.	2,373,900	3,805	3,805	....	....
Metal in uprights .... lbs.	580,000	0	0	0	0
Metal in gates for dams .... lbs.	830,000	0	0	0	0
Metal in lock-gates .... lbs.	561,000	0	0	0	0
Metal in needle-dams .... lbs.	246,000	0	0	0	0
Metal in lock-valves .... lbs.	69,600	0	0	0	0
Metal reinforcement .... lbs.	128,499	4,146	4,146	3	3
Iron castings, plain .... lbs.	34,900	0	0	0	0
Iron castings, machined .... lbs.	22,200	0	0	0	0
Cast-iron shoes for uprights .... lbs.	86,000	0	0	0	0
Wrought iron chain .... lbs.	135,000	0	0	0	0
Wrought iron pipe railing .... lbs.	3,500	0	0	0	0

* Owing to the elevation of the surface of rock under the upper guide-wall of lock No. 15, it was found necessary to replace 79 16-ft. piles by 20-ft. piles; it was also found necessary to replace 81 16-ft. piles by 80 24-ft piles and 1 30-ft. pile under an extra work order dated July 25, 1903."

ERIE CANAL, RESIDENCY NO. 4.

Resident Engineer Philip H. Dater reports:

"Residency No. 4 of the Erie canal extends from a point 2,400 feet east of lock No. 34 of the present canal, at Mindenville, Montgomery county, to the west line of Herkimer county, at the

Barge Canal, Contract No. 8.
Lock at Rotterdam Junction. Building miter-sill wall.

easterly boundary of the city of Utica. The total length of the Barge canal within the limits of the residency is 28 miles.

"For purposes of construction, the work was originally divided into the following contracts: No. 18, land line, Mindenville to Rocky Rift dam; No. 29, land line at Little Falls; No. 31, land line, Jacksonburg to Herkimer; No. 32, movable dam and lock at harbor; No. 30, dredging, being remainder of work on this contract.

"The following changes have been made in the above divisions into contracts:

"Contracts Nos. 29 and 31 were at one time combined into one contract, called No. 31. Later these two parts were again separated and the portion at Little Falls let under the number 31, the portion from Jacksonburg to Herkimer becoming part of No. 30. No. 32 has become part of No. 30. The west end of No. 30, from Sterling creek to the Oneida-Herkimer county line, four miles in length, has been made a separte contract, called No. 29. The east end of contract No. 30, from Rocky Rift dam to Little Falls, has been added to contract No. 20. The work from Little Falls to Sterling creek is now included under contract No. 30.

"The above revisions involve changing from land line to river line, from Fort Herkimer to Herkimer, and from river line to land line, from Frankfort to the Oneida-Herkimer county line.

"The following statements show the condition of the revised plans for the work on this residency:

"Contracts Let.

"*Contract No.* 18. This contract provides for the construction of lock No. 16 at Mindenville, a guard-gate and retaining-dam at Indian Castle, substructures for two highway bridges, 3.63 miles of standard land line and a temporary canal around lock No. 16. The contract was let on December 28, 1906, to the O'Brien & Hoolihan Contracting Company of Syracuse, N. Y., the contract price being $859,460. Work was begun on January 31, 1907. During the summer of 1907 the temporary canal was completed, as was also the steam-shovel work for lock No. 16 and the concrete for the upper guide-walls.

"During the past winter excavation was in progress by steam-

shovel for the prism between Stations 3894 and 3921, the material being placed in the north embankment by train. During the summer excavation has been in progress for the lock and from borrow-pits for the embankment behind the lock-walls. Excavation for the southerly half of the prism, Station 4027 to Station 4060, the west end of the contract, has been in progress by Page bucket, the material being placed directly in the south embankment and the spoil area behind it. Excavation has also been in progress by dredge for the northerly half of the prism, Station 3921 to Station 3951, the material being placed directly in the north embankment and in the spoil behind the embankment.

"The construction of lock No. 16 has been carried on creditably, the concrete being completed, except for the lower guide-wall, the power-house and the lower miter-sill wall. The dam at Castle creek has been about three-fifths completed. A portion of the north abutment for the bridge at Station 3894 has been built.

"A temporary tow-path has been built on the south side of the canal between bridge 133, Station 3894, and bridge 126, Station 3951. A tight board fence was built between this tow-path and the railroad by the West Shore Railroad Company.

"Old bridges Nos. 122, 124 and 125 have been torn down. Bridges Nos. 123 and 126 are used as cross-over bridges for towing purposes.

"The dredging and Page bucket work was done by E. M. Graves, of Cleveland, Ohio, under subcontract. The dredge, which is of dipper type, was built on the site of the work during the spring and summer. Dredging was begun on August 4, 1908.

"There have been the following extra work orders: Graveling temporary tow-path between bridges Nos. 124 and 126; widening approach to temporary canal near bridge No. 122; laying pipe-drain north of canal between Stations 3902 + 80 and 3910, to drain house cellars.

"The progress of work on this contract has, in the main, been satisfactory, though not rapid. The quality of the work, particularly the lock, has been excellent.

"This contract has been under the charge of Mr. George I. Oakley, Assistant Engineer, except during the months of February, March and April, when the work was under the charge of Mr.

Barge Canal, Contract No. 8.
View of the movable dam of bridge type being built at Cranesville, showing an abutment and pier under construction.

Barge Canal, Contract No. 17.
View of the movable dam being built at Tribes Hill, showing abutment, a portion of the concrete sill which extends across the river between abutment and pier, and heavy riprap being placed on each side of the sill.

C. G. Ranney, Leveler, and Mr. F. W. Harris, Assistant Engineer. All three deserve particular mention for the excellent quality of their work.

" The following summary shows the amount of work put under contract and the amount done up to September 30, 1908, including alterations and extra work orders:

ITEM OF WORK.	Preliminary estimate.	Preliminary estimate, including alterations.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing....................lump sum.	$500	$500	$275	$400	55	80
Grubbing....................cu. yds.	26,000	26,000	6,390	7,819	24.5	30
All excavation..................cu. yds.	937,000	948,570	167,500	266,048	17.5	28
Forming embankment..........cu. yds.	500,000	496,120	108,534	143,378	22	29
Lining........................cu. yds.	2,000	2,140	0	0	0	0
Sawed lumber.................ft. B. M.	15,000	1,700	0	0	0	0
White oak in miter-sills.........ft. B. M.	2,000	2,000	0	0	0	0
Sheeting and bracing..........ft. B. M.	10,000	50,000	10,531	11,500	21	23
Foundation piles, 13 ft long .... No.	120	120	0	108	0	90
Foundation piles, 20 ft. long .... No.	140	140	28	28	20	20
Second-class concrete...........cu. yds.	30,000	28,158	16,293	19,310	58	68.5
Reinforced concrete............cu. yds.	500	486	62	62	13	13
Grouted filling.................cu. yds.	950	0	0	0	0	0
First-class masonry coping......cu. yds.	5	5	0	0	0	0
Wash-wall.....................cu. yds.	30,000	30,470	0	0	0	0
Cobble stone paving............sq. yds.	50	50	0	0	0	0
Ballast.......................cu. yds.	100	100	0	0	0	0
Third-class riprap..............cu. yds.	150	150	0	0	0	0
Fourth-class riprap.............cu. yds.	2,500	2,605	334	334	13	13
Structural steel....................lbs.	24,000	22,640	11,076	12,622	49	55.5
Metal reinforcement................lbs.	73,500	55,591	11,324	11,324	20.5	20.5
Cast iron pipe, laid................lbs.	343,000	343,000	0	0	0	0
Steel castings.....................lbs.	4,000	4,000	3,389	3,389	84.5	84.5
Iron castings, plain................lbs.	16,500	14,830	10,211	13,383	69	90
Iron castings, machined............lbs.	9,000	9,000	8,150	8,150	90.5	90.5
Wooden fencing................lin. ft.	3,500	3,448	0	0	0	0
Upper lock-gates..................No.	2	2	.08	.08	4	4
Lower lock-gates..................No.	2	2	.03	.03	1	1
Upper needle-dam.................No.	1	1	.07	.07	7	7
Lower needle-dam.................No.	1	1	0	0	0	0
Lock-valves......................No.	4	4	0	0	0	0
Removal of bridge superstructures...No.	11	11	5	5	45	45
Maintaining traffic....................	$2,000	$2,000	$500	$500	25	25
Deduct for buildings on lands appropriated..........................	3,000	3,000	3,000	3,000	100	100
Second-class concrete in place of grouted filling..........................	0	950	833	833	87.5	87.5
EXTRA WORK.						
Lining temporary canal.........cu. yds.	0	0	0	252	0	100
Steel sheet-piling................sq. ft.	0	0	0	8,000	0	100
Preparation of 200 sand bags..........	0	0	0	$32	0	100
Lining temporary tow-path......cu. yds.	0	0	1,000	1,000	100	100
Widening approach, temporary canal.... ....cu. yds.	0	0	2,172	2,172	100	100
Laying pipe to drain water from cellars...	0	0	$1,144	$1,144	100	100

" *Contract No.* 31. This contract provides for the construction of lock No. 17, a guard-gate, bridge, one mile of land line through the city of Little Falls and for the building of a movable crest on the dam at Rocky Rift. This contract was let on September 2, 1908, to Casey & Murray, of Rochester, N. Y. The engineer's estimate was $813,800; contract price, $829,770.

"The contractors began work on September 12, 1908, on the removal of buildings and assembling of plant. No estimate of work has been rendered to date.

"Appropriation surveys on this contract have been practically completed.

"Mr. F. W. Harris, Assistant Engineer, is in charge of this work.

"Contracts Advertised.

"*Contract No.* 13. This contract provides for the superstructure for highway bridges on contracts Nos. 12 and 18. Advertised; bids to be opened October 1.

"*Contract No.* 20. This contract provides for dredging the Mohawk river from Rexford Flats to Little Falls. The western five miles from Indian Castle to Little Falls is within the limits of this residency. This contract was advertised, bids to be opened on September 9, 1908, but none was received.

"Plans and Estimates in Progress.

"*Contract No.* 29. This contract provides for lock No. 19 at Sterling creek, two highway bridges and four miles of standard land line, with necessary stream protections and spillways, from one-half mile east of Sterling creek to the Oneida-Herkimer county line. This was originally a part of old contract No. 30, which was river location. The pool level, which extends past Utica, has been raised seven feet, the line located about 400 feet north of the Utica straightening channel and the lock location changed from Harbor to Sterling creek.

"The revised plans for the contract, including lock No. 19 and all other structures on the contract, were prepared in this office, ready for submitting to the Advisory Board. The plans and estimate are practically completed.

"*Contract No.* 30. This contract provides for dredging between Little Falls and Jacksonburg, lock No. 18 at Jacksonburg, standard land line from Jacksonburg to Fort Herkimer, a dam and guard-gate at Herkimer, dam at Frankfort, dredging from Fort Herkimer to one-half mile east of Sterling creek, five highway bridges and other minor structures.

"Surveys have been made and borings taken for new location

Barge Canal, Contract No. 17.
Excavating at lock site near Amsterdam.

in the vicinity of Herkimer. Appropriation surveys between Jacksonburg and Fort Herkimer have been completed. Contract plans for lock No. 18 and the line between Jacksonburg and Fort Herkimer have been prepared in this office, the work being now well under way.

"The preparation of contract plans for contracts Nos. 29 and 30 has been under the charge of Mr. D. E. Bellows, Assistant Engineer, and the general office work has been in charge of Mr. E. H. Bourne, Engineering Draftsman, the work of both being very satisfactory.

Tabular Statement of Preliminary Work.

ITEM.	Reported to Sept. 30, 1907.	Sept. 30, 1907, to Sept. 30, 1908.	Total to date of report.
Transit line ... miles.	164	13	177
Levels (including cross-sections) ... miles.	214	9	223
Borings (wash-drill, drive-rod and earth auger) ... lin. ft.	23,025	4,195	27,220
Borings (Calyx drill and test pits) ... lin ft.	420	40	460
Topography ... sq. miles.	3	1	4
White paper plans (1 inch = 100 ft.) ... miles.	33	0	33
Cross-sections ... miles.	37	8	45
Contract tracings ... miles.	22	6	28
Estimates, preliminary ... miles.	28	0	28
Estimates, contract ... miles.	22	6	28
Appropriation surveys ... miles.	6	4	10
Appropriation plans ... miles.	4	3	7
Blue line surveys ... miles.	7	5	12

CHAMPLAIN CANAL, RESIDENCY NO. 1.

Resident Engineer James Burden reports:

"This residency extends from the mouth of the Mohawk river at Waterford to Northumberland, a distance of 27 miles, and comprises contracts Nos. 68, 69 and 70.

"*Field Work.*

"The preliminary field work was nearing completion on September 30, 1907, and consequently most of that done during the year has been that necessitated by modifications in the plan of the work.

"*Borings.* During October, November and December, 1907, and January, 1908, test borings were made by means of drive-rod, auger and wash-drill, at the proposed sites of lock No. 1, dam No. 1, locks Nos. 2 and 3 and adjacent land lines. Drive-rod soundings were also made on the land line at Northumberland.

During July additional drive-rod soundings were made on the land line adjacent to proposed lock No. 1.

"*Cross-sections and Levels.* During October, November and December, 1907, cross-sections were taken every 100 feet along the center line, extending 200 feet each side, on the land lines adjacent to locks Nos. 1 and 2. Cross-sections were also taken on the land line adjacent to lock No. 4 at Stillwater. During January, 1908, cross-sections were taken at the site of the proposed dam at lock No. 4. The land line at lock No. 1 was changed and entirely re-cross-sectioned during July. The bank of the Hudson river at the east end of proposed dam No. 1 was cross-sectioned during August. During October, 1907, levels were run to supposed high-water marks between the sites of locks Nos. 1 and 3.

"*Stadia Survey.* The stadia survey at lock No. 2 was extended 1,500 feet north during October, 1907.

"*Appropriation Surveys.* In August, 1908, appropriation surveys were made at Stillwater and Upper Mechanicville on sites of locks Nos. 3 and 4.

"*Searches.* There has been some miscellaneous work, consisting of the looking up of property owners, boundaries and records of deeds.

"*Office Work.*

"The office work may be divided approximately into three periods, viz.: (1) From October 1, 1907, to February 15, 1908, during which the preliminary map work was completed from the Waterford bridge to Northumberland. (2) From February 15 to June 1, during which the drawings for contract No. 68 were prepared. (3) From June 1 to October 1, during which the drawings of contract No. 69 were being prepared.

"*Preliminary Work.* The work done in the first period includes the plotting of topography along the banks of the Hudson river, plotting contours, plotting borings at the lock sites, preparing large scale drawings of each lock site, plotting profile of proposed center line, plotting cross-sections of river showing excavation, etc., computing the excavation and computing coördinates of proposed center line.

"*Drawings for Contract No. 68.* The work done in the second period includes the preparation of drawings for contract No. 68,

Barge Canal, Contract No. 17.
View showing progress in constructing a movable dam of bridge type at Tribes Hill.

consisting of the three locks — at Northumberland, Stillwater and Upper Mechanicville — including power houses, storehouses, embankments, etc., and a mile of land line.

"*Drawings for Contract No.* 69. The work done in the third period includes preparing drawings for contract No. 69, consisting of two locks, one below Mechanicville and the other above Waterford, and the dam across the Hudson river at the latter.

"There has been an average of ten men employed on the residency during the year in addition to the engineer in charge. Mr. D. F. Fulton, Assistant Engineer, had charge of the residency till March 15, under Mr. E. V. R. Payne, Resident Engineer, at which date the writer assumed charge as Resident Engineer."

CHAMPLAIN CANAL, RESIDENCY NO. 2.

Resident Engineer E. V. R. Payne reports:

"*Contract No.* 1.

"For dredging a channel in the Hudson river from Northumberland, Station 9+52, to Fort Miller, Station 147+75, and from Crocker's Reef, Station 262, to Fort Edward, Station 497+35; the construction of Crocker's Reef dam, the approaches to the head and foot of 'the land line' and other incidental work. Contractor, Empire Engineering Corporation. Engineer in charge for the State, Harry Shoemaker.

"*Dredging.* The two dredges, *Peconic* and *Pontiac,* worked during the months of October and November, 1907, north of Crocker's Reef, excavating the material from the prism, and on November 30, 1907, were taken to the 'land line' and put in winter quarters. In February, 1908, the *Pontiac* was removed to the boat-yard for repairs, which were completed in March, when the dredge was put to work near Belle island in the northerly section of the work. The repairs on the *Peconic* were started in March and continued during April. In May the dredge was put in the old Champlain canal and taken to Fort Miller, where it has been at work until the present date. The *Pontiac,* after having been put in commission in March, has been excavating material from the prism north of Crocker's Reef to date. Approximately

215,225 cubic yards were excavated by these two dredges during the past year.

"*Rock-breaker.* The lower end of the hammer on the Lobnitz rock-breaker was broken on October 20, 1907, in consequence of which the machine was taken out of commission, and on November 30, 1907, it was placed in winter quarters. During February, 1908, the hammer was repaired by machinery which was placed on board the rock-breaker for this purpose. During the latter part of March it was again placed in commission, and during the following months was working most of the time at a point just north of Billing's island. It was taken out of commission July 30 and placed in the 'land line,' and in August it was placed in the old Champlain canal and taken to Fort Miller. Here it was assembled and on August 21 work was started at a point near Fort Miller where contract No. 1 joins contract No. 3, at which point it is at work up to date.

"*Lawlor Spoiling Plant.* The revolving cranes were kept at work during the month of October, 1907, at Lawlor's spoil area, and considerable material was spoiled at this locality, causing the spoil area to be nearly filled. Work was discontinued here at the high stage of water and has not started since.

"*Dike at Billing's Island.* When alteration No. 3 was put in force on November 23, 1907, the *Pontiac* was utilized to build a dike from Billing's island northerly, and it continued to work along this dike until the close of the season — November 30, 1907. The work on this dike was again taken up in the spring of 1908 and continued until May, when the same was nearly completed.

"*Dike at Belle Island.* During May the dredge *Pontiac* threw up about one-quarter of the dike which was to be formed from Belle island northerly. It then discontinued work at this point and proceeded to work again on the dike at Billing's island.

"*Wash-wall.* About 900 cubic yards of wash-wall were placed in the 'land line' at Crocker's Reef during the month of August, 1908. During the following months about 3,200 cubic yards were placed in land line, making a total of about 4,100 cubic yards in place at this date.

"*Embankment.* During July, 1908, about 1,500 cubic yards of material were placed in the 'land line,' and in August and September, 3,000 cubic yards and 4,000 cubic yards, respectively,

Plant for washing and screening gravel and sand and loading them in canal boats by belt conveyors; situated near Mindenville and furnishing concrete materials for several Barge canal structures.

making a total of 8,500 cubic yards in place to date. Of this quantity about 4,900 cubic yards were excavated from the borrow-pit, which it was necessary to lay out in order to obtain satisfactory material for embankment.

"*Breakwater Pier.* During the month of June, 1908, the water in the river subsided to an elevation that would permit the forms for the breakwater pier to be erected. During the following month about 533 cubic yards of second-class concrete were placed in the breakwater pier, and 240 cubic yards of broken stone were also placed in the pockets already built. During August, 1908, 500 cubic yards of concrete were placed, which completed the pier. Also, 400 cubic yards of broken stone were placed in the pockets of breakwater. During August, 1908, about 75 cubic yards of first-class riprap were placed around the up-stream end of the pier.

"*Cribs at Fort Miller.* At the present date nine cribs have been started and are built up to the low-water elevation. These cribs were towed to a point near Fort Miller, where they are now lying.

"The following is a summary of the items on contract No. 1 as they stand on September 30, 1908, and as modified by all alterations to date:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent. of work done during year.	Per cent of work done to date.
Clearing ... acres.	19.34	0	8.708	0.0	45.0
Grubbing ... cu. yds.	2,400	1,029	2,366	42.9	99.9
All excavation ... cu. yds.	768,560	226,524	658,595	29.5	85.7
Form'ng embankment ... cu. yds.	26,000	8,502	19,974	32.7	76.8
Yellow pine timber, sawed ... ft. B. M.	90,000	867	24,174	1.0	26.8
Round timber ... lin. ft.	70,750	0	38,857	0.0	54.9
Iron and steel fastenings ... lbs.	3,500	308	308	8.8	8.8
First-class concrete ... cu. yds.	1,000	0	828	0.0	90.0
Second-class concrete ... cu. yds.	4,065	1,035	3,449	25.4	84.8
Third-class concrete ... cu. yds.	300	0	331	0.0	100.0+
Wash wall, including coping ... cu. yds.	7,750	4,187	4,187	54.0	54.0
Stone filling in cribs ... cu. yds.	7,757	1,241	4,078	16.0	52.6
First-class riprap ... cu. yds.	326	92	92	28.0	28.0

"*Contract No. 3.*

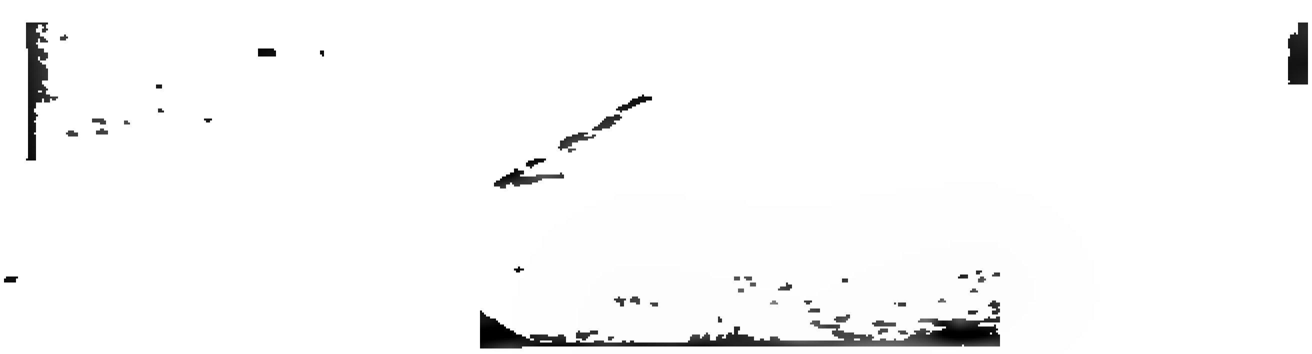
"For the excavation of the canal and the protection of its banks from Station 147+75, below lock No. 6 at Fort Miller, to Station 262+00, above the guard-gate at Crocker's Reef; the construction

of lock No. 6 and its approaches, the guard-gate and its approaches, the bridge abutments and foundations at Stations 151+60, 173+18, 213+46 and 247+50; the removal and reërection of the present bridge at East street; the change in location of the old Champlain canal and all other incidental work. Contractors, Sundstrom & Stratton. Engineers in charge for the State, L. C. Hulburd, First Assistant Engineer, October 1, 1907, to March 1, 1908; Clinton A. Curtis, Assistant Engineer, March 1, 1908, to September 30, 1908.

"*Excavation.* The excavation of the canal prism was begun in April, 1905, and with the exception of a small amount handled by teams and a grader and the work in the lock pit at Fort Miller, the excavation has been done by three steam-shovels, with a car plant. The material has been spoiled on the east side between the Barge canal and the old Champlain canal. The major part of the excavation of the canal prism is completed. The balance of the excavation yet to be done is on the slopes and in the bottom, and is not suitable for steam-shovel work. Steam-shovel work was continued until November 17, 1907, when the two large shovels were removed from the cut. A small shovel, which had been caught in the slide on the west side of the prism, between Stations 220 and 226, was left to complete the excavation. In December a second shovel was brought on the work and excavated the spoil stored on the east side of the temporary canal. This was handled by cars across the canal and used for backfill for the lock-walls and to complete the approaches to the Fort Miller bridge. This work was finished in January, 1908. At the same time the approaches to the Ridge road bridge were being built, covered with lining; the wooden fencing was also placed, and the work was closed down on January 20, 1908, for the winter. Steam-shovel work was resumed in the canal prism at Station 220 on June 10, and continued at this point until the work was finished. The slide mentioned above was removed three times before the bank ceased to move into the prism.

"*Embankment.* The embankment back of the lock and south approach-walls is complete except for trimming. Work has also been started back of the east wall of the north approach, material for which is being taken from a borrow-pit on the lands lying east of the temporary canal opposite lock No. 6.

Barge Canal, Contract No. 1.
View of Crocker's Reef dam, western section.



Barge Canal, Contract No. 1.
View of Crocker's Reef dam, western section.

"*Concrete.* All concrete work in connection with lock No. 6 and its approaches, with the exception of the small amount of additional wall along the temporary canal near old lock No. 13 and that needed to complete the Fort Miller culvert extension, is completed.

"*Supplementary Agreements — Contract No. 3.*

Alteration No. 1. The object of this alteration is to make the plans for contract No. 3 conform to the requirements of Canal Board resolution of July 27, 1905.

Alteration No. 2. The object of this alteration is to eliminate from the plans of contract No. 3 all work left undone after June 1, 1906, between Station 252 and Station 256, and between Station 256 and Station 258+19, east of a line parallel with and twenty feet westerly from the center line.

Alteration No. 3. The object of this alteration is to afford better service in canal crossings and adjacent highways by altering the location and design of bridge abutments and approaches at Station 213+10, to provide for a new highway bridge, grading the spoil bank and surfacing with lining between Stations 213 and 250 and abandoning the bridge abutments and approaches provided at Station 248. Also, to better protect the new canal from high water in the Hudson river by raising the west embankment to elevation 129.5 between Stations 228 and 252 and abandoning work on the highway along the river.

Alteration No. 4. The object of this alteration is to change the location and form of the retaining wall between Stations 256 and 262 on the west side of the canal so as to make the wall conform to the new plans for a guard-gate.

Alteration No. 5. The object of this alteration is to secure a proper foundation for the retaining wall provided for in alteration No. 4, by moving the angle in the wall from Station 260 to Station 260+60, thereby adding 60 feet to the length of the wall.

Alteration No. 6. This alteration extends the time for the completion of contract No. 3 to December 1, 1908.

Alteration No. 7. The object of this alteration is to provide for the building of recesses for operating machinery and capstans required by a change in the plans.

"In the summary the preliminary estimate gives total quantities as affected by the alterations. Of the above alterations, No. 2 is not effective, and the work described under alterations Nos. 3 and 4 was done under the work order dated October 10, 1906.

"The amount paid by the State on account of contract No. 3 is as follows:

Original contract and effective alterations, including the 10 per cent retained by State...	$567,790 00
Work order of October 10, 1906............	36,043 70
Work order of October 8, 1907............	3,713 67
Work order of October 21, 1907............	32 00
Work order of July 21, 1908..............	2,866 08
Total..........................	$610,445 45

"*Extra and Unspecified Work Orders.*

"The following extra or unspecified work orders were made effective during the year:

Extra or Unspecified Work Order Dated October 10, 1906. This was for work done under what was formerly known as alterations Nos. 4 and 5, in excavating for and building concrete retaining walls on the west side of the canal near Crocker's Reef and dam, between Stations 256 and 262. (See resolution of the Canal Board adopted January 29, 1908.) Amount paid to contractor on a basis of cost plus 15 per cent was $36,043.70.

Extra and Unspecified Work Order Dated October 8, 1907. For driving sheet-piling and building embankment at the northerly end of contract No. 3, to protect same from flood waters of the Hudson river. Amount, $3,713.67.

Extra and Unspecified Work Order Dated October 21, 1907. For constructing and placing 48 lineal feet of additional railing on each side of the west approach to Payne's bridge and 32 lineal feet on each side of the east approach to Payne's bridge. Amount, $32.

Extra and Unspecified Work Order Dated July 21, 1908. For furnishing and placing fender fastenings; furnishing 4-inch wrought-iron vent pipes at lock culverts, lock No. 6, and fur-

BARGE CANAL, CONTRACT NO. 1.
Completed embankment at north end of land line, where it enters the Hudson river at Crocker's Reef.

BARGE CANAL, CONTRACT NO. 1.
Placing wash-wall in approach to land line at Crocker's Reef.

nishing coping stone for back walls of bridge abutments. Amount, $2,866.08.

For work necessary in changing the lock-gate recesses at lock No. 6, the upper approach-walls, and to furnish and place fender fastenings, as shown on supplementary detail sheets Nos. 67, 68 and 69, and all work incidental thereto. This work was practically completed September 30, 1908, and amounted to $10,975.68, but as the estimate was not rendered until October, the above amount does not appear in the summary.

"The following is a summary of the items on contract No. 3, as they stand on September 30, 1908:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing....lump sum.	1	0	All.	0.0	100.0
Grubbing....cu. yds.	8,389	0	6,984	0.0	83.0
All excavation....cu. yds.	837,231	47,738	747,152	5.6	89.2
Forming embankment....cu. yds.	115,503	12,544	96,019	10.8	83.1
Lining....cu. yds.	5,300	1,880	4,432	29.1	83.6
Puddle....cu. yds.	900	0	734	0.0	81.5
Yellow pine timber and plank....ft. B. M.	50,000	0	21,602	0.0	43.2
Yellow pine timber in stop logs....ft. B. M.	0	0	0	0.0	0.0
White oak timber in miter-sills....ft. B. M.	3,000	592	592	19.7	19.7
Hemlock timber and plank....ft. B. M.	11,000	0	9,179	0.0	83.4
Round timber in cribs....lin. ft.	0	0	0	0.0	0.0
Foundation piles, 15 ft. long....No.	8	0	8	0.0	100.0
Foundation piles, 20 ft. long....No.	4	0	4	0.0	100.0
Foundation piles, 25 ft. long....No.	4	0	4	0.0	100.0
Mooring piles, 15 ft. long....No.	0	0	0	0.0	0.0
Mooring piles, 25 ft. long....No.	0	0	0	0.0	0.0
First-class concrete....cu. yds.	0	0	0	0.0	0.0
Second-class concrete....cu. yds.	36,711	14,757	33,601	40.2	91.5
Third-class concrete....cu. yds.	450	0	378	0.0	83.9
First-class masonry....cu. yds.	10	0	0	0.0	0.0
Wash-wall, including coping....cu. yds.	27,458	0	178	0.0	0.63
Stone filling in cribs....cu. yds.	0	0	0	0.0	0.0
First-class riprap....cu. yds.	1,600	0	0	0.0	0.0
Iron castings....lbs.	136,867	48,448	123,649	35.4	90.4
Steel castings....lbs.	5,000	1,231	1,477	24.6	29.5
Structural steel....lbs.	65,403	4,132	27,906	6.3	42.6
Wooden fencing....lin. ft.	4,800	1,790	2,944	37.3	61.3
Upper lock-gates, complete in place....No.	0	0	0	0.0	0.0
Lower lock-gates, complete in place....No.	0	0	0	0.0	0.0
Gates for guard-gate....No.	0	0	0	0.0	0.0
48-in. sluice-gate for guard-gate....No,	0	0	0	0.0	0.0
Removing and resetting old bridge superstructure....lump sum.	1	0	All.	0.0	100.0
Sidewalk....lin. ft.	450	91	91	20.2	20.2
Iron castings, machined....lbs.	24,000	0	25,152	0.0	104.9
All excavations (outside original lines).cu. yd.	18,000	2,064	20,550	10.3	114.1
All additional forms, etc., for concrete, ...lump sum.	1	0	All.	0.0	100.0
All additional forms, etc., for recesses for operating machinery and capstans lump sum.	1	$196 54	All.	50.0	100.0
Gross estimate....	$689,831	$100,950	$567,790	14.6	82.3

"*Contract No.* 3-A.

"For the removal of certain dwellings, barns, stables, shops, outhouses and other structures, their foundations and other accessories, the cleaning out of all vaults and cesspools and disposal of their contents, building foundations, for moving house to parcel No. 148, for excavating cellar and for moving schoolhouse on parcel No. 141, on the site of contract No. 3. Contractors, Sundstrom & Stratton. Engineers in charge for the State, L. C. Hulburd. First Assistant Engineer, October 1, 1907, to March 1, 1908; Clinton A. Curtis, Assistant Engineer, March 1, 1908, to September 30, 1908.

"There has been no change in the condition of work in connection with contract No. 3-A since September 30, 1907.

"*Contract No.* 7.

"For furnishing and erecting in place steel highway bridge superstructures as follows: On contract No. 3, Champlain canal, section 2, bridge at Fort Miller, Station 151+84.54; bridge at Ridge road, Station 173+18; Payne's bridge, Station 213+10. Contractor, The Groton Bridge Company. Engineers in charge for the State, L. C. Hulburd, First Assistant Engineer, October 1, 1907, to March 1, 1908; Clinton A. Curtis, Assistant Engineer, March 1, 1908, to September 30, 1908.

"Work on this contract was completed July 14, 1908, and consisted of the following items and quantities:

ITEM OF WORK.	Gross estimate, as modified by alterations.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Structural steel ... lbs.	326,000	126,275	318,257	38.7	97.6
Railings ... lin. ft.	84	0	84	0.0	100.0
Yellow pine or Douglas fir, sawed lumber prime ... ft. B. M.	11,000	10,408	10,408	94.6	94.6
Yellow pine sawed lumber, merchantable ... ft. B. M.	18,000	699	17,190	3.8	95.5
Setting stone copings ... cu. yds.	6.4	2.0	6.1	31.2	95.3
Lining ... cu. yds.	7.0	7.0	7.0	100.0	100.0
Gross estimate ...	$16,880	$6,520	$16,450	38.6	97.4

"*Contract No.* 26.

"For dredging a channel in the Hudson river between the south end of contract No. 27, Station 1245, at Fort Edward, Washing-

Barge Canal, Contract No. 27.
Hydraulic dredge at work just south of Fort Edward.

ton county, and the north end of contract No. 1, Station 1286+33 = Station 497+35. Contractor, Lake Erie Dredging Company. Engineer in charge for the State, Harry Shoemaker.

"This contract was awarded to the Lake Erie Dredging Company, of Buffalo, N. Y., and signed March 23, 1908.

"Owing to the difficulties in getting the dredge through the locks of the Champlain canal, at Waterford and Fort Miller, it did not arrive until June 10. The plant, consisting of a 1¾-yard dipper dredge, two dump scows and a small steam tug, was transferred from the old Champlain canal to the Moses kill and then brought up the river from contract No. 1 to the site of the work, south of Fort Edward.

"On July 13, 1908, the contractor started to dredge a channel from the east side of the river, near Station 1276, westerly to the part of the river which was laid out as a spoil area. During the remainder of July the dredge excavated a channel in the spoil area and piled the material along the west side of it (forming an earth dike), in order to get deep water in which to dump scows of material dredged from the prism.

"The building of the round timber bulkhead, which was to separate this spoil area from the river proper, was immediately started from the northerly end and built southerly. The dike in the spoil area and the channel were so arranged that any material dumped into the spoil area before the bulkhead was built would be confined to the spoil area.

"During the month of August the dredge worked in the prism proper for about ten days and excavated about 6,200 cubic yards of material, all earth, and in September, 4,300 cubic yards were taken out of the channel, making a total of 10,500 cubic yards.

"During August a pumping plant, consisting of a 14-inch centrifugal pump, an 80-horse-power engine, with a boiler of approximately 100 horse-power, was assembled and installed on a small scow 20 ft. x 40 ft. This plant has been pumping material from the channel in spoil area back of the dike, thereby causing the channel to afford a means of dumping scows. For a greater portion of the time, however, this plant did not handle the material as well as was anticipated, due to the large amount of sawmill refuse mixed with the sand and gravel, and a great amount of

time was lost in bringing the dredge from the prism to the spoil area and allowing it to cast the material up and clear the channel for the scows.

"The following is a summary of the items on contract No. 26 as they stand on September 30, 1908:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing .... lump sum	1	0	0	0 0	0.0
All excavation .... cu. yds.	172,000	10,507	10,507	6.1	6.1

"*Contract No. 27.*

"For excavating the canal and protecting its sides, constructing locks Nos. 7 and 8, and junction lock, necessary spillways, power plants and appertaining structures, a concrete arch bridge, bridge substructures and approaches, retaining walls, highways and other incidental details, between Station 1046+16, the south end of contract No. 25, at Dunhams Basin road, Washington county, and the Hudson river, at Fort Edward, Washington county, Station 1245. Contractor, Kinser Construction Company. Engineers in charge for the State, Herbert Spencer, First Assistant Engineer, October 1, 1908, to November 1, 1908; S. W. Belding, Assistant Engineer, November 1, 1907, to September 30, 1908.

"*Excavation.* The excavation for the prism of the canal has been completed during the year between Stations 1102 and 1137, making the prism excavation complete between the north end of the contract, at Station 1046+16, and Station 1137. The excavation for the main walls of lock No. 8 has also been completed. Between Stations 1147 and 1180, and also between Stations 1186 and 1202, about 148,000 cubic yards of material have been taken out of the prism, bringing it to grade over a considerable portion of this length. At the site of the main walls of lock No. 7 and to the south, about 25,000 cubic yards were moved. The excavation has been made also for the main walls of the junction lock and for the northeast approach-wall.

"Under alteration No. 5, about 27,500 cubic yards were taken

Barge Canal, Contract No. 27.
Lock No. 6, a little north of Fort Edward, nearing completion.

from the new diversion channel of Bond creek, and extending from Station 0 to Station 42; also about 2,000 cubic yards from the new ditch to the east of the prism between Stations 1055 and 1120.

"*Embankment.* No embankment has been built as yet along the canal prism, but the highway approaches to the Dunhams Basin bridge have been about two-fifths completed, and those for the East street bridge are about one-fifth in place. The embankment against the main walls of the junction lock and the northeast approach-wall are roughly complete.

"*Foundation Piles.* For the foundation of the junction lock, 744 piles 24 feet long were driven, also 60 piles 20 feet long, for the abutments to the Dunhams Basin bridge.

"About 76,000 feet B. M. of 9-inch sheet-piling were driven for the main walls at the junction lock.

"*Concrete.* The junction lock at Fort Edward, with its splay walls, and the northeast approach-wall, of a length of about 180 feet, has been completed.

"The abutments of the Dunhams Basin bridge are about five-eighths complete.

"In lock No. 8 about 9,200 cubic yards of concrete have been laid, which includes the floor, the miter-sill backings, the breast-wall and some of the side walls to elevation 142.5. The miter-sills are set, and ten feet of the quoin-plates at the southeast corner are in place.

"*Other Items.* A number of other smaller items of work have been begun and some finished, as may be seen by the attached summary. A temporary highway around the north end of the contract has been constructed to accommodate traffic along the Dunhams Basin-Adamsville road.

"*Plant.* The contractor's plant has been largely increased during the year by machinery and outfit received from other of the company's work, and also by new material purchased.

"Among the items of plant might be mentioned an outfit of about 100 mules and horses with all necessary wagons, scrapers, etc., with four-wheel graders, or wagon loaders; two ten-ton locomotives, about 20 flat and dump cars, with ties, rails, etc.; a new 4 to 12-ton locomotive crane, two new derricks, three new rotary

pumps and traction engines and quite a large supply of buckets, cable, etc.

"A new Hains concrete mixing plant has been erected and is being operated by electricity.

"The two revolving derricks, equipped with 2-yard Page buckets, have been almost entirely rebuilt. They are now operated by electricity, in place of steam, with far better results.

"A new hydraulic dredge, with 12-inch suction, is under construction for use in the neighborhood of lock No. 7.

"The following is a summary of the items on contract No. 27 as they stand on September 30, 1908, as modified by alterations 1, 2, 3, 4 and 5:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing .... lump. sum	1	0	0	29	60.4
Grubbing .... cu. yds.	13,123	5,130	7,675	39.1	58.5
All excavation .... cu. yds.	1,425,593	479,270	613,859	33.6	43.0
Sheeting and bracing .... ft. B. M.	23,000	3,670	3,670	16	16
Forming embankment .... cu. yds.	227,023	10,029	10,029	4.4	4.4
Gravel lining .... cu. yds.	5,227	0	0	0	0
Yellow pine and Douglas fir sawed lumber .... ft. B. M.	58,800	5,700	5,700	1	1
Hemlock, sawed lumber .... ft. B. M.	600	0	0	0	0
Yellow pine in lock-gates .... ft. B. M.	7,000	0	0	0	0
White oak .... ft. B. M.	5,020	2,970	2,970	59.2	59.2
Foundation piles, 12 ft. long .... No.	57	0	0	0	0
Foundation piles, 15 ft. long .... No.	2,647	0	0	0	0
Foundation piles, 20 ft. long .... No.	5,956	60	60	1	1
Sheet-piling .... ft. B. M.	460,632	75,780	75,780	16.4	16.4
Wrought iron pipe railing .... lin. ft.	70	0	0	0	0
Second-class concrete .... cu. yds.	59,527	12,842	12,842	21.6	21.6
Reinforced concrete .... cu. yds.	1,159	12	12	1	1
Metal reinforcement .... lbs.	154,817	2,613	2,613	1.7	1.7
Masonry bridge coping .... cu. yds.	17	2	2	11.8	11.8
Wash-wall .... cu. yds.	23,726	0	0	0	0
Second-class stone paving .... sq. yds.	668	0	0	0	0
Third-class riprap .... cu. yds.	162	0	0	0	0
Wooden fencing .... lin. ft.	6,500	0	0	0	0
Structural steel .... lbs.	258,875	4,205	4,205	1.6	1.6
Iron castings .... lbs.	141,910	27,573	27,573	19.4	19.4
Iron castings, machined .... lbs.	14,500	9,020	9,020	62.2	62.2
Sluice-gates .... No.	1	0	0	0	0
Lowering Argyle street bridge superstructure .... lump sum.	1	0	0	0	0
Removing old bridge superstructures. lump sum	1	0	0	0	0
Maintaining traffic .... lump sum.	1	0	0	0	0
Deduct for buildings .... lump sum.	1	0	0	0	0
Cast-iron quoin-plates .... lbs.	18,300	1,141	1,141	6.2	6.2
Cast-iron pipe .... lbs.	216,394	0	0	0	0
Wooden pavement .... sq. yds.	350	0	0	0	0
Lattice railing .... lin. ft.	152	0	0	0	0
15-inch vitrified pipe .... lin. ft.	35	0	0	0	0
Maintaining traffic at two bridges over Bond creek diversion channel .... lump sum.	1	0	0	0	0

BARGE CANAL, CONTRACT NO. 27.

Abutment for Dunhams Basin highway bridge. View shows n ew form of abutment, having a concrete slab as the approach.

CHAMPLAIN CANAL, RESIDENCY NO. 3.

Resident Engineer Fred C. Davis reports:

"This residency extends from the highway crossing at Dunhams Basin, Washington county, to Lake Champlain, at Whitehall, Washington county, a distance of 19.8 miles.

"*Contract No.* 15. For excavating the canal and protecting its sides, constructing lock No. 11, dam No. 4, lock No. 12, dam No. 5, and appertaining structures, a spillway, a highway, two masonry culverts, five bridges with their piers and abutments and other incidental details, between Lake Champlain at Whitehall, Washington county, Station 0-73, and Station 356, on Wood creek, about 0.6 mile north of Comstock post-office, Washington county. The length of this contract is 6.8 miles. It was awarded to the Atlantic, Gulf & Pacific Company on August 9, 1906.

"Work on the Whitehall lock, No. 12, has been carried on during the entire year. The river wall has been a little more than two-thirds completed. The dredge *Champlain* and diking machines began operations in April near the guard-lock highway and have completed about 4¼ miles of canal northerly. The dredge is just south of the village limits of Whitehall.

"At lock No. 11 the pile foundation has been completed and about three-fourths of the concrete placed. All work has been progressing very satisfactorily up to date.

"Summary for the year ended September 30, 1908:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing ... acres.	12.36	6.30	12.36	51	100
Grubbing ... cu. yds.	12,000	7,025	7,025	58	58
All excavation ... cu. yds.	2,900,000	1,546,388	1,888,629	53	65
Sheeting and bracing ... ft. B. M.	50,000	0	11,076	0	22
Embankment ... cu. yds.	200,000	0	1,736	0	0.85
Piling ... No.	7,300	2,379	3,016	32	41
Sheet-piling ... ft. B. M.	225,000	74,929	74,929	33	33
All classes of concrete ... cu. yds.	55,820	21,136	21,136	38	38
4-inch vitrified pipe ... lin. ft.	300	238	238	79	79
Iron castings, plain ... lbs.	166,000	100,819	100,819	60	60
Iron castings, machined ... lbs.	50,000	30,775	30,775	61	61
Structural steel ... lbs.	1,100,000	11,585	11,585	1	1
Metal reinforcement ... lbs.	140 000	10,138	10,138	7	7
Needle-dam, upper end of Lock No. 12, lump sum ...	1	10%	10%	10	10
Gross estimate ...	$1,523,820	$589,050	$690,340	38	45

"*Contract No.* 25. For excavating the canal and protecting its sides, constructing locks Nos. 9 and 10* and necessary spillways, power plants and appertaining structures, bridge substructures and approaches, retaining walls, highways and other incidental details, between Station 356, about 0.6 mile north of Comstock post-office, Washington county, and Station 1041+54, which is also Station 1046+16 at Dunhams Basin road, Washington county. The length of this contract is 13 miles. It was awarded to the Atlantic, Gulf & Pacific Company on November 19, 1906.

"The dredge *Fort Edward* and diking machines began operations in April and continued excavating south. The diking machines have completed all dikes between Fort Ann and Smiths Basin. They have also made the excavation for East creek, Wood creek and the siphon spillway at Smiths Basin. The dredge is now about 800 feet north of Smiths Basin highway. The rock cut at lock No. 19 on the present Champlain canal has been opened and about one-fourth excavated.

"Summary for the year ended September 30, 1908:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done † during year.	Per cent of work done to date.
Clearing ... acres.	65.69	33.06	41.50	48	63
Grubbing ... cu. yds.	38,000	3,782	4,611	10	12
All excavation ... cu. yds.	5,511,000	1,536,034	1,741,283	27	31
Embankment ... cu. yds.	286,400	8,007	8,007	2	2
Piling ... No.	2,590	174	174	7	7
Sheet-piling ... ft. B. M.	37,000	8,814	8,814	32	32
All classes of concrete ... cu. yds.	33,510	467	467	1	1
Third-class riprap ... cu. yds.	3,600	35	35	1	1
Ballast ... cu. yds.	308	28	28	9	9
Metal reinforcement ... lbs.	85,000	3,332	3,332	4	4
Gross estimate ...	$1,717,649	$359,910	$407,570	21	24

*An alteration to this contract was executed January 29, 1908, providing for the substitution of one lock, to be known as lock No. 9, for the two locks, known as locks Nos. 9 and 10."

IMPROVEMENT OF PUBLIC HIGHWAYS.

(Chapter 115, Laws of 1898, and amendatory laws.)

Detailed accounts of highway contracts completed during the year and also those pending at its close are given under their respective headings, as follows:

CONTRACTS COMPLETED DURING THE YEAR ENDED SEPTEMBER 30, 1908.

CHESTER–VAIL'S GATE ROAD, NO. 154–A, ORANGE COUNTY.

Length, 11.49 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $29,098.

Contract dated, July 20, 1906.

Work commenced, October, 1906.

Work completed, November, 1907.

Final account, $26,463.80.

Contractor, Orange County Road Construction Company.

Engineers in charge, F. W. Hartwell, F. N. Sanders and J. R. Kaley.

Road No. 154–A extends from the village of Chester easterly to Vail's Gate, in the towns of Chester, Blooming Grove, Cornwall and New Windsor. Local stone was used for both courses of this road.

WOODBURY–CENTRAL VALLEY ROAD, NO. 157, ORANGE COUNTY.

Length; 3.48 miles.

Width of gravel, 18 feet.

Engineer's preliminary estimate of total cost, including engineering, $24,330.

Contract dated, July 20, 1906.

Work commenced, July, 1906.

Work completed, October, 1907.

NOTE.— Roads marked with an asterisk require trimming; otherwise completed.

Final account, $20,237.07.

Contractor, Orange County Road Construction Company.

Engineers in charge, R. D. Hayes and J. R. Kaley.

Road No. 157 connects Woodbury and Central Valley. This road was constructed with gravel surface.

NEWBURGH–SHAWANGUNK ROAD, NO. 161, ORANGE COUNTY.

Length, 8.61 miles.

Width of macadam and shale, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $77,070.

Contract dated, June 18, 1904.

Work commenced, August, 1904.

Work completed, November, 1907.

Final account, $69,206.64.

Contractor, Orange County Road Construction Company.

Engineers in charge, F. M. Williams and H. E. Poole in 1906; J. R. Kaley and F. W. Hartwell in 1907.

Road No. 161 extends from the city line of Newburgh, northwesterly to the Ulster county line, connecting with the proposed system of improved highways through Ulster county. Local stone was used from Station 0+0 to Station 191+0, and from Station 191+0 to Station 454+78 the wearing surface was changed from gravel (which was originally contemplated) to local stone and shale.

BRUNSWICK–TURNPIKE ROAD, NO. 227, RENSSELAER COUNTY.

Length, 3.1 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $30,700.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, November, 1907.

Final account, $28,050.70.

Contractor, Corliss Construction Company.

Engineers in charge, J. T. Brady and H. P. Condon.

Road No. 227 connects the village of Eagle Mills with the city of Troy. Local stone was used for bottom course and trap-rock for middle and top courses of this road.

SAUGERTIES–KINGSTON ROAD, No. 228, ULSTER COUNTY.

Length, 5.66 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $55,700.

Contract dated, June 29, 1906.

Work commenced, August, 1906.

Work completed, October, 1907.

Final account, $53,661.18.

Contractor, John E. Consalus.

Engineer in charge, H. T. Titus.

Road No. 228 runs southerly from Saugerties to Charles Hubscher's hotel in the towns of Saugerties and Ulster. Local stone was used in both courses of this road.

KINGSTON–HIGH FALLS ROAD, No. 229, ULSTER COUNTY.

Length, 6.93 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $82,300.

Contract dated, October 1, 1906.

Work commenced, December, 1907.

* Work will be completed.

Final account, $74,080.

Contractor, Shanley–Morrissey, Inc.

Engineers in charge, F. N. Sanders and L. T. Howard.

Road No. 229 extends from the city line of Kingston southerly to the eastern corporation line of Rosendale, and from the bridge over the Delaware and Hudson canal to the town line of Marbletown in the towns of Ulster and Rosendale. Local stone was used in both courses of this road.

KINGSTON–ELLENVILLE (SECTION 1) ROAD, NO. 230, ULSTER COUNTY.

Length, 8.27 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $88,200.

Contract dated, July 11, 1906.

Work commenced, September, 1907.

Work completed, August, 1908.

Final account, $81,434.09.

Contractor, Joseph Walker.

Engineers in charge, J. R. Kaley and F. N. Sanders.

Road No. 230 extends from the Rochester town line through the village of Stone Ridge to the Hurley town line in the town of Marbletown. Local stone was used to form the bottom and top courses, with local stone screenings for binder.

POST (SECTION 1) ROAD, NO. 231, ULSTER COUNTY.

Length, 7.08 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $71,100.

Contract dated, July 7, 1906.

Work commenced, August, 1906.

Work completed, April, 1908.

Final account, $60,560.15.

Contractor, McNamee & Rice.

Engineers in charge, J. R. Kaley and Frank N. Sanders.

Road No. 231 extends from the town line of Marbletown in the town of Lloyd. Local stone was used in both courses of this road.

FRANKFORT–EAST SCHUYLER ROAD, NO. 233, HERKIMER COUNTY.

Length, 1.64 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $14,300.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, November, 1907.

Final account, $12,810.78.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, O. J. Dempster in 1906, and E. A. Lamb, F. J. Mulvaney and T. J. Schoenlaub in 1907.

Road No. 233 extends from the railroad freighthouse at Frankfort, westerly to the Bridenbecker creek cross-road in the town of Schuyler. Local stone was used for bottom course and trap-rock for middle and top courses of this road.

DELHI–MIDDLETOWN ROAD, NO. 239, DELAWARE COUNTY.

Length, 4.96 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $53,300.

Contract dated, August 30, 1906.

Work commenced, October, 1906.

Work completed, September, 1908.

Final account, $46,559.84.

Contractor, Morris Kantrowitz.

Engineers in charge, E. C. Hackett and J. A. O'Connor.

Road No. 239 extends from State road No. 36 westerly to Margaretville in the town of Middletown. Local stone was used in both courses of this road.

COHOES–WATERFORD ROAD, NO. 240, SARATOGA COUNTY.

Length, 1 mile.

Width of paving, 35 feet.

Engineer's preliminary estate of total cost, including engineering, $33,950.

Contract dated, July 3, 1906.

Work commenced, August, 1906.

Work completed, December, 1907.

Final account, $32,418.22.

Contractor, John W. Flynn.

Engineers in charge, Ralph Russell and R. Hopkins.

Road No. 240 extends from the Mohawk river bridge to the town of Waterford. This road is built with vitrified brick pavement laid on six-inch concrete foundation with a sand cushion and a concrete curb and gutter on either side.

The United Traction Company operates a double-track trolley line on this street and paid for twenty feet of paving for the entire length.

SARATOGA–BALLSTON ROAD, NO. 241, SARATOGA COUNTY.

Length, 4.335 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $40,370.

Contract dated, July 13, 1906.

Work commenced, November, 1906.

Work completed, May, 1908.

Final account, $33,401.66.

Contractor, Schenectady Contracting Company.

Engineers in charge, E. A. Lamb, C. R. Allen, Jr. and W. S. McLachlin.

Road No. 241 connects the villages of Saratoga Springs and Ballston Spa. Local stone is used for bottom course and traprock for middle and top courses on this road.

SARATOGA–GLENS FALLS (SECTION 2) ROAD, NO. 242, SARATOGA COUNTY.

Length, 1.25 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $9,820.

Contract dated, July 13, 1906.

Work commenced, May, 1907.

Work completed, October, 1907.

Final account, $8,558.20.

Contractor, Saratoga Trap Rock Company.

Engineers in charge, E. A. Lamb, C. R. Allen, Jr. and H. E. Blake.

Road No. 242 extends from the east line of the town of Greenfield northerly in the town of Wilton. Local stone was used for bottom course and trap-rock for middle and top courses.

MECHANICVILLE-STILLWATER ROAD, NO. 243, SARATOGA COUNTY.

Length, 1.84 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $27,700.

Contract dated, July 9, 1906.

Work commenced, September, 1906.

* Work will be completed.

Final account, $25,556.30.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, Ralph Russell, E. A. Lamb, C. R. Allen, Jr. and G. A. Ensign.

Road No. 243 connects the villages of Mechanicville and Stillwater. Local stone was used for bottom course and trap-rock for middle and top courses of this road.

SARATOGA-SCHUYLERVILLE ROAD, NO. 244, SARATOGA COUNTY.

Length, 6.01 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $59,550.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, September, 1908.

Final account, $53,623.43.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, Ralph Russell, E. A. Lamb, C. R. Allen, Jr. and A. J. Kaufman.

Road No. 244 extends from the village line of Schuylerville westerly to the town line of Saratoga Springs. Approved stone

was used for the bottom course and trap-rock for the middle and top courses of this road.

GLOVERSVILLE–MECCO–PHELPS ROAD, NO. 246, FULTON COUNTY.

Length, 2.03 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $21,000.

Contract dated, July 12, 1906.

Work commenced, August, 1906.

Work completed, November, 1907.

Final account, $17,098.82.

Contractor, Robert Shafer.

Engineers in charge, Lee Walker, E. A. Lamb, R. J. Murray and George R. Halpin.

Road No. 246 consists of two sections. The Gloversville–Mecco section connects Mecco with the city of Gloversville. The Phelps section connects Talmadge Parson Corners with the city of Gloversville. Approved stone was used for all three courses of this road.

GLOVERSVILLE–BROADALBIN ROAD, NO. 248, FULTON COUNTY.

Length, 2.02 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $22,300.

Contract dated, September 1, 1906.

Work commenced, August, 1907.

Work completed, July, 1908.

Final account, $16,091.18.

Contractor, Schenectady Contracting Company.

Engineers in charge, E. A. Lamb, R. J. Murray and George R. Halpin.

Road No. 248 extends from the Mayfield road at Dennies Crossing easterly to the F. J. & G. R. R. crossing. Local stone was used for all three courses of this road.

PLATTSBURG–KEESEVILLE (SECTION 3) ROAD, NO. 258, CLINTON COUNTY.

Length, 5.44 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $56,700.

Contract dated, July 9, 1906.

Work commenced, April, 1907.

Work completed, December, 1907.

Final account, $48,221.77.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, A. G. Chapman and H. J. Langlois.

Road No. 258 is a continuation of State road No. 137 and extends southerly from the village of Peru to the village of Keeseville. Local stone was used for all three courses of this road.

PLATTSBURG–MOOERS (SECTION 2) ROAD, NO. 259, CLINTON COUNTY.

Length, 7.34 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $75,107.

Contract dated, July 6, 1906.

Work commenced, August, 1906.

Work completed, October, 1907.

Final account, $59,496.25.

Contractor, Buckley Construction Company.

Engineers in charge, F. L. Bisbee and H. J. Langlois.

Road No. 259 extends from the city of Plattsburg northerly through East Beekmantown to the southerly end of State road No. 138. Local stone was used in bottom course and limestone in the top course of this road.

PLATTSBURG–MOOERS (SECTION 3) ROAD, NO. 260, CLINTON COUNTY.

Length, 4.31 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $43,660.

Contract dated, August 1, 1906.

Work commenced, September, 1906.

Work completed, July, 1908.

Final account, $39,057.16.

Contractor, The Buckley Construction Company.

Engineers in charge, C. H. Chilvers and H. J. Langlois.

Road No. 260 extends from the northerly end of State road No. 138 to the village of Mooers. Local stone was used in both courses of this road.

PEEKSKILL–SALEM CENTER (SECTION 1) ROAD, NO. 261, WESTCHESTER COUNTY.

Length, 5.86 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $50,150.

Contract dated, July 6, 1906.

Work commenced, August, 1907.

*Work will be completed.

Final account, $44,720.26.

Contractor, Ryan & Yale.

Engineers in charge, J. T. O'Hora, Perry Filkin and J. R. Kaley.

Road No. 261 extends from State road No. 149, at the north end of Amawalk reservoir, through Somers Center and Somers to the Croton river in the town of Somers. Local stone is being used in all three courses of this road.

PEEKSKILL–SALEM CENTER (SECTION 2) ROAD, NO. 262, WESTCHESTER COUNTY.

Length, 4.66 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,250.

Contract dated, July 6, 1906.

Work commenced, August, 1906.

Work completed, October, 1907.

Final account, $33,373.14.

Contractor, The Scofield Company.

Engineers in charge, J. T. O'Hora and Perry Filkin.

Road No. 262 extends from the Croton river easterly through Purdy, around the north side of Titicus reservoir, through Salem Center to road No. 151 in the town of North Salem. Local stone was used in all three courses of this road.

GREENVILLE–SLATE HILL ROAD, NO. 282, ORANGE COUNTY.

Length, 7.13 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $65,900.

Contract dated, August 30, 1906.

Work commenced, October, 1906.

Work completed, August, 1908.

Final account, $59,792.95.

Contractors, DeGraff and Hogeboom.

Engineers in charge, J. R. Kaley, R. D. Hayes and F. N. Sanders.

Road No. 282 connects the villages of Greenville and Slate Hill. Local stone was used in all three courses of this road.

GREENVILLE–PORT JERVIS ROAD, NO. 283, ORANGE COUNTY.

Length, 5.11 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $72,000.

Contract dated, September 4, 1906.

Work commenced, November, 1906.

*Work will be completed.

Final account, $63,799.50.

Contractor, Orange County Road Construction Company.

Engineers in charge, J. R. Kaley, R. D. Hayes and F. N. Sanders.

Road No. 283 connects the villages of Greenville and Port Jervis. Local stone was used in all three courses of this road.

AVERILL PARK–CROOKED LAKE ROAD, NO. 284, RENSSELAER COUNTY.

Length, 3.61 miles.

Width of macadam, 14, 16 and 20 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,440.

Contract dated, July 2, 1906.

Work commenced, August, 1906.

Work completed, June, 1908.

Final account, $32,132.83.

Contractor, Martin Murray.

Engineers in charge, J. T. Brady, C. F. Crowley and LeRoy J. McCarthy.

Road No. 284 is a continuation of State road No. 194, in Averill Park, and extends southerly through the villages of Sand Lake and Glasshouse to the Nassau town line. Local stone was used in all three courses of this road.

NASSAU–BRAINARD ROAD, NO. 285, RENSSELAER COUNTY.

Length. 3.65 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $34,900.

Contract dated, July 7, 1906.

Work commenced, August, 1906.

Work completed, December, 1907.

Final account, $31,764.64.

Contractor, Thomas H. Karr.

Engineer in charge, F. B. Morss.

Road No. 285 extends from the village of Nassau easterly for a distance of 3.65 miles. Local stone was used in all three courses of this road.

RENSSELAER–BEST ROAD, NO. 287, RENSSELAER COUNTY.

Length, 4.75 miles.

Width of macadam, 12 feet, except through De Freestville, where it is 20 feet wide.

Engineer's preliminary estimate of total ost, including engineering, $43,750.

Contract dated, August 30, 1906.

Work commenced, October, 1906.

Work completed, December, 1907.

Final account, $40,203.73.

Contractor, Morris Kantrowitz.

Engineer in charge, F. B. Morss.

Road No. 287 extends from the city line . Rensselaer southeasterly through De Freestville and Best to the town line of Sand Lake. Local stone was used in all three courses.

AMSTERDAM–HAGAMAN ROAD, NO. 298, MONTGOMERY COUNTY.

Length, 2.20 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $19,400.

Contract dated, July 9, 1906.

Work commenced, August, 1907.

Work completed, September, 1908.

Final account, $14,824.10.

Contractors, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, E. A. Lamb, J. B. Wright, C. R. De Graff and C. H. Hoyt.

Road No. 298 connects the village of Hagaman with the city of Amsterdam. Local stone was used in both courses of this road.

SAULWATER'S CORNERS–YOUNG'S CORNERS ROAD, NO. 299, MONTGOMERY COUNTY.

Length, 2.77 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $29,100.

Contract dated, July 11, 1906.

Work commenced, April, 1907.

Work completed, May, 1908.

Final account, $26,372.10.

Contractor, Joseph Walker.

Engineers in charge, E. A. Lamb, J. B. Wright and C. H. Hoyt.

Road No. 299 extends from State road No. 32 southwesterly to the corner near the property of James A. Young. Local stone was used in both courses.

FONDA–TRIBES HILL ROAD, NO. 303, MONTGOMERY COUNTY.

Length, 2.21 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $20,900.

Contract dated, September 3, 1907.

Work commenced, April, 1908.

Work completed, September, 1908.

Final account, $19,184.46.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, E. A. Lamb, J. B. Wright and C. H. Hoyt.

Road No. 303 extends from State road No. 152 easterly to State road No. 108. The original contract called for the use of trap-rock, granite or gneiss for the top course of this road and approved stone for the bottom. This was later changed so that the road was built of approved stone in both courses.

KINGSTON–ELLENVILLE (SECTION 2) ROAD, NO. 305, ULSTER COUNTY.

Length, 7.25 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $71,725.

Contract dated, July 3, 1906.

Work commenced, September, 1906.

*Work will be completed.

Final account, $63,199.60.

Contractor, Town of Rochester.

Engineers in charge, A. C. Perkins, J. R. Kaley, C. C. Ahles and F. N. Sanders.

Road No. 305 extends from the town line of Wawarsing northeasterly to the town line of Marbletown. Local stone was used in the two courses of this road.

KINGSTON–ULSTER LANDING ROAD, NO. 306, ULSTER COUNTY.

Length, 5.564 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $58,100.

Contract dated, September 3, 1907.

Work commenced November, 1907.

*Work will be completed.

Final account, $51,385.12.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, Herbert Michael, L. T. Howard and F. N. Sanders.

Road No. 306 extends from the city line of Kingston northerly to the town line of Saugerties. The original contract called for the use of approved stone for bottom course and trap-rock for the top course, but later was changed to approved stone for the top course.

PLATTEKILL–MODENA ROAD, NO. 307, ULSTER COUNTY.

Length, 7.16 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $73,100.

Contract dated, September 3, 1907.

Work commenced, April, 1908.

*Work will be completed.

Final account, $58,214.19.

Contractor, Joseph Walker.

Engineers in charge, L. T. Howard and F. N. Sanders.

Road No. 307 extends from the Orange County line northerly through Plattekill, Sylva and Modena to the town line of Gardiner. Approved stone was used in both courses of this road.

NEW PALTZ–RIFTON ROAD NO. 308, ULSTER COUNTY.

Length, 4.16 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $57,850.

Contract dated, January 10, 1908.

Work commenced, April, 1908.

*Work will be completed.

Final account, $47,690.65.

Contractor, Joseph Walker.

Engineers in charge, L. T. Howard and F. N. Sanders.

Road No. 308 extends from the village line of New Paltz northeasterly to the village line of Rifton. Approved stone was used in both courses of this road.

MIDDLETOWN–CUDDEBACKVILLE (SECTION 1) ROAD, NO. 312, ORANGE COUNTY.

Length, 4.396 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $42,100.

Contract dated, September 4, 1906.

Work commenced, November, 1906.

Work completed, July, 1908.

Final account, $37,333.20.

Contractor, The Orange County Road Construction Company.

Engineers in charge, J. R. Kaley, R. D. Hayes and F. N. Sanders.

Road No. 312, section 1, extends from the city line of Middletown westerly to Station 259+35.3, near Pierson's crossing, in towns of Wallkill and Mount Hope. Local stone was used in both courses of this road.

MIDDLETOWN–CUDDEBACKVILLE (SECTION 2) ROAD, NO. 313, ORANGE COUNTY.

Length, 5.18 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $65,450.

Contract dated, September 3, 1907.

Work commenced, November, 1907.

*Work will be completed.

Final account, $51,389.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, R. D. Hayes and F. N. Sanders.

Road No. 313 extends from Station 117+65, Road No. 312, to the village line of Cuddebackville. Approved stone was used in both courses of this road.

GILBERTSVILLE–MOUNT UPTON ROAD, NO. 314, OTSEGO COUNTY.

Length, 4.37 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $46,900.

Contract dated, June 30, 1906.

Work commenced, April, 1907.

Work completed, September, 1908.

Final account, $52,782.85.

Contractor, S. B. Van Wagenen.

Engineers in charge; J. A. O'Connor and J. C. Patrick.

Road No. 314 extends from the village of Gilbertsville southwesterly to the Unadilla river bridge at Mount Upton in the town of Butternuts. Local stone was used in both courses of this road.

MORRIS–GILBERTSVILLE (SECTION 1) ROAD, NO. 315, OTSEGO COUNTY.

Length, 3.537 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $32,700.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, May, 1908.

Final account, $29,842.80.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 315, section 1, extends from the village line of Morris southeasterly to the town line of Butternuts. Local stone was used in both courses of this road.

SHADY SIDE–OTEGO ROAD, NO. 317, OTSEGO COUNTY.

Length, 2.73 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $26,200.

Contract dated, July 10, 1906.

Work commenced, October, 1906.

Work completed, July, 1908.

Final account, $24,261.79.

Contractor, Siver and Gould.

Engineers in charge, J. A. O'Connor, J. C. Patrick and William M. Payne.

Road No. 317 extends from the corners at Shady Side southwesterly to the town line of Otego. The original contract called for the use of local stone for both courses of this road, but on account of the heavy traffic it was changed by special agreement, as follows: Limestone for both courses between stations 0 and 38+67 and local stone for bottom and trap-rock for top course from station 38+67 to end of road.

SCHENEVUS–MARYLAND ROAD, NO. 319, OTSEGO COUNTY.

Length, 3.66 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,300.

Contract dated, June 30, 1906.

Work commenced, July, 1906.

Work completed, October, 1907.

Final account, $34,760.92.

Contractor, S. B. Van Wagenen.

Engineers in charge, J. C. Patrick and M. C. Barker.

Road No. 319 extends from the village of Schenevus westerly through Chaseville and Maryland to the Maryland Cemetery. Limestone was used in both courses of this road.

PEEKSKILL–SALEM CENTER (SECTION 3) ROAD, No. 331, WESTCHESTER COUNTY.

Length, 3.88 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $47,800.

Contract dated, July 20, 1906.

Work commenced, October, 1906.

*Work will be completed.

Final account, $47,164.20.

Contractors, Bellew and Merritt Company.

Engineers in charge, Perry Filkin, C. H. Chilvers and J. R. Kaley.

Road No. 331 extends from the village line of Peekskill easterly for a distance of 3.88 miles in the towns of Cortland and Yorktown. Local stone was used in both courses of this road.

PEEKSKILL–SALEM CENTER (SECTION 4) ROAD, No. 332, WESTCHESTER COUNTY.

Length, 3.23 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $39,650.

Contract dated, July 20, 1906.

Work commenced, May, 1907.

Work completed, December, 1907.

Final account, $35,898.45.

Contractors, Bellew and Merritt Company.

Engineers in charge, Perry Filkin, F. A. Biggi and J. R. Kaley.

Road No. 332 is a continuation of State road No. 331, running easterly through the village of Yorktown to State road No. 149. Local stone was used in both courses of this road.

SARATOGA–CORINTH ROAD, NO. 340, SARATOGA COUNTY.

Length, 7.25 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $63,500.

Contract dated, July 6, 1906.

Work commenced, April, 1907.

Work completed, May, 1908.

Final account, $52,920.83.

Contractor, Buckley Construction Company.

Engineers in charge, E. A. Lamb, C. R. Allen, Jr., Arthur C. Eaton and H. S. Mattimore.

Road No. 340 extends from the north village line of Saratoga Springs through the villages of Greenfield Center and North Greenfield to the Corinth village line in the town of Greenfield. Local stone was used for the bottom course and trap-rock for the middle and top courses of this road.

STOCKPORT–HUDSON ROAD, NO. 341, COLUMBIA COUNTY.

Length, 2.60 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $30,150.

Contract dated, July 6, 1906.

Work commenced, July, 1906.

Work completed, July, 1908.

Final account, $23,047.69.

Contractor, John W. Polcaro.

Engineers in charge, John R. Kaley and E. W. Sylvester.

Road No. 341 extends from the city line of Hudson northerly to the southerly line of the town of Stockport. Local stone was used for bottom and middle courses and trap-rock for top course of this road.

CHATHAM–CHATHAM CENTER ROAD, NO. 342, COLUMBIA COUNTY.

Length, 1.12 miles.

Width of gravel, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $8,700.

Contract dated, August 28, 1906.

Work commenced May, 1907.

Work completed, July, 1908.

Final account, $7,229.60.

Contractor, John W. Polcaro.

Engineers in charge, John R. Kaley and E. W. Sylvester.

Road No. 342 extends from the residence of Daniel Angel northerly to the north end of Sutherland's hill, in the town of Chatham. This road was constructed with a gravel surface.

FRANKFORT–UTICA (SECTION 2) ROAD, NO. 359, HERKIMER COUNTY.

Length, 1.89 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $18,700.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, July, 1908.

Final account, $16,748.34.

Contractor, Charles R. Lewis.

Engineers in charge, O. J. Dempster, E. A. Lamb and F. J. Mulvaney.

Road No. 359 extends from a point 1.11 miles west of the village line of Frankfort to a point 3 miles west of Frankfort. Local stone was used for bottom course and trap-rock for top course of this road.

JOHNSTOWN–TRIBES HILL (SECTION 1) ROAD, NO. 361, FULTON COUNTY.

Length, 2.22 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $24,000.

Contract dated, July 9, 1906.

Work commenced, August, 1906.

Work completed, October, 1907.

Final account, $20,267.60.

Contractor, Ulysses G. Stockwell.

Engineers in charge, H. C. Wells, R. G. Murray and E. A. Lamb.

Road No. 361 extends from the city line of Johnstown on East State street easterly to the Montgomery county line. Local stone was used in all three courses of this road.

NORTHVILLE–CHAPMAN'S CORNERS ROAD, NO. 362, FULTON COUNTY.

Length, 1.71 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $20,900.

Contract dated, September 3, 1907.

Work commenced, May, 1908.

Work completed, September, 1908.

Final account, $19,085.05.

Contractor, Alonzo Schaupp.

Engineers in charge, E. A. Lamb, R. J. Murray and C. H. Hoyt.

Road No. 362 extends from the Sacandaga river bridge at Northville southerly through Sacandaga Park to the corners near the property of Andrew Chapman. Local stone was used for the bottom course and trap-rock for the top course of this road.

MAYFIELD–NORTHVILLE (SECTION 1) ROAD, NO. 363, FULTON COUNTY.

Length, 1.37 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $12,900.

Contract dated, September 3, 1907.

Work commenced, June, 1908.

* Work will be completed.

Final account, $11,193.85.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, E. A. Lamb, R. J. Murray and C. H. Hoyt.

Road No. 363 extends from the village line of Mayfield northeasterly to the arch culvert near the property of Dennie Brothers. Approved stone was used in both courses of this road.

PRESTON HOLLOW–POTTER HOLLOW ROAD, No. 364, ALBANY COUNTY.

Length, 3.13 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $27,400.

Contract dated, July 12, 1906.

Work commenced, September, 1906.

* Work will be completed.

Final account, $24,441.26.

Contractor, Robert Shafer.

Engineers in charge, Ludlow L. Melius, George A. Flynn and J. A. O'Connor.

Road No. 364 extends from the Cheese Hill road in Preston Hollow southwesterly through Cooksburg to the highway intersections in Potter Hollow. Local stone was used in all three courses of this road.

GLOVERSVILLE–BULL RUN ROAD, No. 376, FULTON COUNTY.

Length, 2.38 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $25,400.

Contract dated, September 3, 1907.

Work commenced, July, 1908.

* Work will be completed.

Final account, $23,588.24.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, E. A. Lamb, R. J. Murray and C. H. Hoyt.

Road No. 376 extends from the city line of Gloversville at Luther street northwesterly to the bridge at the foot of the hill at Bull Run. Local stone was used in both courses of this road.

WALDEN–PINE BUSH ROAD, NO. 382, ORANGE COUNTY.

Length, 6.57 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $69,600.

Contract dated, December 18, 1907.

Work commenced, March, 1908.

* Work will be completed.

Final account, $58,851.06.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, F. N. Sanders and R. D. Hayes.

Road No. 382 extends from the village line of Walden northwesterly through Allards to the highway intersection at the top of the hill in Pine Bush. Local stone was used in the bottom course and trap-rock in the top course of this road.

ALBANY–SCHENECTADY (SECTION 2) ROAD, NO. 385, ALBANY COUNTY.

Length, 5.14 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $63,500.

Contract dated, September 3, 1907.

Work commenced, November, 1907.

Work completed, September, 1908.

Final account, $54,112.26.

Contractor, Robertson and Gerehart Contracting Company.

Engineers in charge, J. A. O'Connor and C. H. Chilvers.

Road No. 385 extends from State road No. 176, at Wolf road, northwesterly to State road No. 179, at the Schenectady county line. The original contract called for the use of trap-rock, granite or gneiss in both courses of this road, but was later changed by special agreement to approved limestone.

KITCHAWAN–CROTON LAKE ROAD, NO. 405, WESTCHESTER COUNTY.

Length, 2.25 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $18,625.

Contract dated, September 20, 1907.

Work commenced May, 1908.

* Work will be completed.

Final account, $15,732.20.

Contractor, Stewart-Kerbaugh-Shanley Company.

Engineers in charge, J. R. Kaley and W. G. Craig.

Road No. 405 extends from State road No. 145, at Kitchawan, northerly to State road No. 148, at Croton Lake. Approved stone was used in the bottom course and trap-rock in the top course of this road.

TROY–SCHENECTADY (SECTION 2) ROAD, NO. 407, SCHENECTADY COUNTY.

Length, 3.025 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,400.

Contract dated, September 4, 1907.

Work commenced, October, 1907.

*Work will be completed.

Final account, $35,640.72.

Contractors, Malloy & Davis.

Engineers in charge, J. A. O'Connor and L. G. Bayly.

Road No. 407 extends from State road No. 1 southeasterly to the Albany county line. The original contract called for the use of trap-rock, granite or gneiss for both courses of this road, but was later changed by special agreement to local stone.

GLENS FALLS–LAKE GEORGE ROAD, NO. 417, WARREN COUNTY.

Length, 7.56 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $84,700.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, November, 1907.

Final account, $77,448.25.

Contractors, Casey and Murray.

Engineer in charge, Orson C. Richards.

Road No. 417 extends from the corporation line of the city of Glens Falls northwesterly and northerly to the southerly corporation line of the village of Lake George. Local stone was used for bottom course of this road, with sand for filler; trap-rock for middle and top courses, with screenings for binder.

LAKE GEORGE–BOLTON LANDING ROAD, NO. 418, WARREN COUNTY.

Length, 9.74 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $108,875.

Contract dated, July 10, 1906.

Work commenced, April, 1907.

Work completed, November, 1907.

Final account, $103,871.

Contractors, Casey and Murray.

Engineer in charge, Orson C. Richards.

Road No. 418 extends from the corporation line of the village of Lake George northerly through the village of Bolton Landing to the bridge over Finkle brook. Local stone was used in all three courses of this road.

RHINEBECK–HYDE PARK ROAD, NO. 432, DUTCHESS COUNTY.

Length, 3.26 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,725.

Contract dated, August 31, 1906.

Work commenced, October, 1906.

* Work will be completed.

Final account, $33,085.40.

Contractors, Lawlor and Haines.

Engineers in charge, J. R. Kaley and N. A. Taylor.

Road No. 432 extends from the village line of Rhinebeck southerly to the Hyde Park town line. Local stone was used in both courses of this road.

CHAZY–CHAZY LANDING–OBER'S CORNERS ROAD, NO. 433, CLINTON COUNTY.

Length, 4.60 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $40,925.

Contract dated, September 1, 1906.

Work commenced, September, 1907.

Work completed, August, 1908.

Final account, $34,913.65.

Contractor, Buckley Construction Company.

Engineers in charge, H. J. Langlois and Keefer Lindsey.

Road No. 433 extends from the Delaware and Hudson railroad in the village of Chazy southeasterly to the road leading to the dock in the village of Chazy Landing and from State road No. 138, at Ober's Corners, easterly through Sciota to the road leading to Mooers. Local stone was used in both courses of this road.

JERICHO TURNPIKE–PLAINVIEW ROAD, NO. 436, NASSAU COUNTY.

Length, 6.98 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $87,150.

Contract dated, September 1, 1906.

Work commenced, April, 1907.

Work completed, October, 1907.

Final account, $82,038.96.

Contractor, Jeremiah T. Finch.

Engineers in charge, J. R. Kaley, James L. Chapman, James Sturdevant and F. J. Kinney.

Road No. 436 extends from the macadam road at Jericho northeasterly to the Suffolk county line and from the Woodbury-Hicksville macadam road southeasterly to the Farmingdale–Plainview macadam road. Approved stone was used for the bottom course and trap-rock for the middle and top courses of this road.

JERUSALEM AVENUE–FRONT STREET ROAD, NO. 437, NASSAU COUNTY.

Length, 7.09 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $81,000.

Contract dated, September 4, 1907.

Work commenced, April, 1908.

Work completed, September, 1908.

Final account, $74,592.64.

Contractor, Russell Contracting Company.

Engineers in charge, Herbert Spencer and W. S. Gray.

Road No. 437 extends from the Bellmore avenue road easterly to the Hicksville macadam road and from the village line of Hempstead northeasterly to the Bethpage turnpike. Trap-rock was used in both courses of this road.

EAST NASSAU–BRAINARD ROAD, NO. 439, RENSSELAER COUNTY.

Length, 3.78 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $44,500.

Contract dated, September 20, 1907.

Work commenced, October, 1907.

Work completed, September, 1908.

Final account, $39,146.07.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, Perry Filkin, C. H. Hoyt and Leroy J. McCarthy.

Road No. 439 extends from the southerly end of State road No. 196 southerly through the village of East Nassau and thence westerly through the village of Brainard to the westerly end of State road No. 285 and southerly to Brainard station. Approved stone was used in both courses of this road.

SARATOGA–GLENS FALLS (SECTIONS 4 AND 5) ROAD, NO. 441, SARATOGA COUNTY.

Length, 8.32 miles.

Width of macadam, 14 feet.

The original culvert and walls at Sta. 64.

The original culvert at Sta. 67 + 67, after a washout.

POUGHKEEPSIE–HYDE PARK ROAD, NO. 453, DUTCHESS COUNTY.

Engineer's preliminary estimate of total cost, including engineering, $74,700.

Contract dated, August 31, 1906.

Work commenced, May, 1907.

*Work will be completed.

Final account, $62,390.33.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, E. A. Lamb, C. R. Allen, Jr., H. E. Blake and Perry Filkin.

Road No. 441 extends from State road No. 242 northerly to the village of Wilton to State road No. 58, at the town line of Moreau, and from the village line of South Glens Falls southwesterly to State road No. 58. Local stone was used in both courses of this road.

SARATOGA–GREENFIELD–SCHUYLERVILLE–GLENS FALLS ROAD, No. 443, SARATOGA COUNTY.

Length, 6.28 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $60,300.

Contract dated, September 20, 1907.

Work commenced, April, 1908.

*Work will be completed.

Final account, $51,988.77.

Contractor, Stewart-Kerbaugh-Shanley Company.

Engineers in charge, Perry Filkin and C. R. Allen, Jr.

Road No. 443 extends from the village line of Saratoga Springs in Waring avenue northwesterly to State road No. 340, at the town line of Greenfield, and from the village line of Saratoga Springs easterly to the town line of Saratoga, and from the village line of Saratoga Springs northerly to State road No. 242, at the town line of Wilton. Local stone was used for bottom course and trap-rock for top course of this road.

POUGHKEEPSIE–HYDE PARK ROAD, No. 453, DUTCHESS COUNTY.

Length, 4 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $52,450.

Contract dated, July 10, 1906.

Work commenced, November, 1906.

*Work will be completed.

Final account, $42,923.60.

Contractor, McNamee and Rice.

Engineers in charge, J. R. Kaley and N. A. Taylor.

Road No. 453 extends from the Poughkeepsie–Hyde Park town line northerly to the south line of the property of F. W. Vanderbilt in the village of Hyde Park. Local stone was used in the bottom course and trap-rock in the top course of this road.

LITTLE FALLS–EAST CREEK ROAD, NO. 456, HERKIMER COUNTY.

Length, 5.39 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $61,500.

Contract dated, July 9, 1906.

Work commenced, September, 1906.

*Work will be completed.

Final account, $30,307.08.

Contractors, Ulysses G. Stockwell and Joseph Walker.

Engineers in charge, O. J. Dempster, E. A. Lamb, F. J. Mulvaney and W. E. Petty.

Road No. 456 extends from the city line of Little Falls easterly along the north side of the Mohawk river to the Montgomery county line at East Creek. This contract was originally awarded to Ulysses G. Stockwell, but after his forfeiture it was readvertised and awarded to Joseph Walker on July 1, 1908. Trap-rock was used for both courses of this road.

LITTLE FALLS–HERKIMER ROAD, NO. 457, HERKIMER COUNTY.

Length, 5.32 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $65,700.

Contract dated, July 9, 1906.

View of the new 8-foot arch culvert at Sta. 64.

View showing the new arch culvert at Sta. 64; also old retaining wall strengthened by new buttresses.

POUGHKEEPSIE–HYDE PARK ROAD, NO. 453, DUTCHESS COUNTY.

Work commenced, August, 1906.
*Work will be completed.
Final account, $59,400.25.
Contractor, Sylvester A. Seymour.
Engineers in charge, O. J. Dempster, E. A. Lamb, F. J. Mulvaney and W. D. Hildredth.

Road No. 457 extends from the city line of Little Falls westerly along the northerly side of the Mohawk river to the village line of Herkimer. Local stone was used for the bottom course and trap-rock for the top course of this road.

HERKIMER–FRANKFORT ROAD, NO. 458, HERKIMER COUNTY.

Length, 3.69 miles.
Width of macadam, 16 feet.
Engineer's preliminary estimate of total cost, including engineering, $38,925.
Contract dated, July 10, 1906.
Work commenced, August, 1906.
Work completed, August, 1908.
Final account, $33,293.63.
Contractor, John H. Nelson & Company.
Engineers in charge, O. J. Dempster, E. A. Lamb and F. J. Mulvaney.

Road No. 458 extends from the corporation line of the village of Herkimer westerly along the northerly side of the Mohawk river to the easterly end of State road No. 233. Local stone was used for the bottom course and trap-rock for the top course of this road.

EAST SCHUYLER–DEERFIELD ROAD, NO. 459, HERKIMER COUNTY.

Length, 5.53 miles.
Width of macadam, 16 feet.
Engineer's preliminary estimate of total cost, including engineering, $62,300.
Contract dated, July 9, 1906.
Work commenced, August, 1906.
Work completed, September, 1908.
Final account, $56,201.90.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, O. J. Dempster, E. A. Lamb and F. J. Mulvaney.

Road No. 459 extends from the end of State road No. 233 northwesterly through the village of West Schuyler to the end of State road No. 3 at the Oneida county line. Local stone was used for the bottom course and trap-rock for the top course of this road.

HERKIMER–MIDDLEVILLE ROAD, NO. 460, HERKIMER COUNTY.

Length, 6.30 miles.

Width of macadam, 12, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $72,515.

Contract dated, July 10, 1906.

Work commenced, October, 1906.

*Work will be completed.

Final account, $82,504.61.

Contractor, John H. Nelson & Company.

Engineers in charge, E. A. Lamb, F. J. Mulvaney and F. C. Woodward.

Road No. 460 extends from the corporation line of the village of Herkimer northerly along the West Canada creek to the corporation line of the village of Middleville. Local stone was used in both courses of this road.

MIDDLEVILLE–POLAND ROAD, NO. 461, HERKIMER COUNTY.

Length, 6.07 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $78,800.

Contract dated, October 22, 1907.

Work commenced, March, 1908.

*Work will be completed.

Final account, $67,395.81.

Contractor, Newport Construction Company.

Engineers in charge, E. A. Lamb, F. J. Mulvaney and C. H. Hoyt.

Road No. 461 extends from the corporation line of the village

of Middleville northwesterly along the West Canada creek to the southerly corporation line of the village of Newport and from the northerly corporation line of the village of Newport northwesterly to the corporation line of the village of Poland. Approved stone is being used in the bottom course and trap-rock in the top course of this road.

AUSABLE FORKS–CLINTONVILLE ROAD, NO. 476, CLINTON COUNTY.

Length, 5.38 miles.

Width of macadam, 14 and 22 feet.

Engineer's preliminary estimate of total cost, including engineering, $57,150.

Contract dated, August 31, 1906.

Work commenced, June, 1907.

Work completed, July, 1908.

Final account, $52,279.75.

Contractor, Clinton Beckwith Engineering and Contracting Company.

Engineers in charge, A. G. Chapman, F. N. Sanders and H. J. Langlois.

Road No. 476 extends from the bridge over the Ausable river in Ausable Forks village in the town of Black Rock to the intersection of Fulton street in the village of Clintonville. Local stone was used in both courses of this road.

VALLEY FALLS ROAD, NO. 477, RENSSELAER COUNTY.

Length, 6.47 miles.

Width of macadam, 14 feet; gravel, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $53,950.

Contract dated, November 18, 1907.

Work commenced, April, 1908.

*Work will be completed.

Final account, $48,929.46.

Contractors, Rockefeller Brothers.

Engineers in charge, Perry Filkin, H. P. Willis and R. Hopkins.

Road No. 477 extends from the corporation line of the village

of Valley Falls southerly to the road leading to Tomhannock, and from the corporation line of the village of Valley Falls easterly to the village of Johnsonville, and from the corporation line of the village of Valley Falls westerly to the road leading to Schaghticoke, and from the Boston & Maine Railroad southerly to Tomhannock creek near Schaghticoke Hill in the towns of Pittstown and Schaghticoke. The original contract called for the surfacing of a portion of this road with gravel and the remainder with approved stone in both courses, but this was later changed by special agreement to trap-rock in both courses of the macadam portion.

HAYNERVILLE-RAYMERTOWN ROAD, NO. 478, RENSSELAER COUNTY.

Length, 3.21 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $31,120.

Contract dated, November 26, 1907.

Work commenced, May, 1908.

*Work will be completed.

Final account, $26,958.23.

Contractor, P. A. Lillis.

Engineers in charge, Perry Filkin, C. H. Hoyt and H. P. Willis.

Road No. 478 extends from the end of State road No. 84, at Haynerville, northeasterly through the village of Raymertown to the highway intersection just west of Tomhannock creek. The original contract called for the use of local stone in both courses of this road, but was later changed by special agreement to limestone in the top course.

HOOSICK-NORTH HOOSICK ROAD, NO. 490, RENSSELAER COUNTY.

Length, 6.35 miles.

Width of gravel, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $28,325.

Contract dated, November 26, 1907.

Work commenced, May, 1908.

*Work will be completed.

Final account, $24,424.66.

Contractor, P. A. Lillis.

Engineers in charge, Perry Filkin, H. P. Willis and Dale C. Roberts.

Road No. 490 extends from the corporation line of the village of Hoosick Falls northerly through the village of North Hoosick, thence northwesterly to the Washington county line, and from the corporation line of the village of Hoosick Falls southerly along the westerly side of the Hoosic river to the covered bridge. This road was constructed with a gravel surface.

TARRYTOWN–WHITE PLAINS–RYE ROAD, NO. 503, WESTCHESTER COUNTY.

Length, 7.32 miles.

Width of macadam, 16, 20 and 22 feet.

Engineer's preliminary estimate of total cost, including engineering, $101,700.

Contract dated, October 16, 1907.

Work commenced, January, 1908.

*Work will be completed.

Final account, $85,852.35.

Contractors, Molloy and Murray.

Engineers in charge, J. R. Kaley and H. E. Breed.

Road No. 503 extends from the easterly village line of Tarrytown southeasterly through Elmsford to the westerly village line of White Plains, and from the White Plains-Harrison town line southeasterly to the Harrison-White Plains town line, and from the southwesterly White Plains-Harrison town line southeasterly to the corporation line of the village of Rye. Approved stone was used in the bottom course and trap-rock in the top course of this road.

SELKIRK–COEYMANS ROAD, NO. 508, ALBANY COUNTY.

Length, 4.77 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,000.

[illegible] 1907.

[illegible] 1908.

[illegible] 1908.

[illegible]

[illegible] Contracting Company.

Engineers in charge, [illegible] and E. R. [illegible].

[illegible] State road No. [illegible] southerly through the village of [illegible] to the [illegible] county line. The [illegible] in the top course [illegible] of this road, but was later [illegible] in the top course.

[illegible] Road, No. 519, Westchester County.

[illegible] miles.

W[illegible] 14 feet.

[illegible] of total cost, including engineering [illegible].

[illegible] 1907.

[illegible] November, 1907.

[illegible]

[illegible] $[illegible].

[illegible] Shanley-Morrissey, Inc.

[illegible] in charge, J. R. Kaby, C. T. Fisher and H. E. Ree[illegible].

Road No. 519 extends from the corporation line of the village [illegible] Kisco southwesterly to the corporation line of the village [illegible] Pleasantville. Approved stone was used in both courses of the road.

[illegible]ocantico Hills Road, No. 520, Westchester County.

[illegible]les.

[illegible]m, 14 feet.

[illegible]inary estimate of total cost, including engi-

[illegible]

September 20, 1907.

[illegible]l, November, 1908.

Work completed, September, 1908.
Final account, $33,062.94.
Contractor, Shanley-Morrissey, Inc.
Engineers in charge, John R. Kaley, H. E. Breed and Gordon Edson.

Road No. 520 extends from the corporation line of the village of Pleasantville southwesterly to the Putnam division of the N. Y. C. & H. R. R. near Pocantico Hills in the town of Mount Pleasant. Approved stone was used in both courses of this road.

WEST CHAZY–CHAZY ROAD, NO. 533, CLINTON COUNTY.

Length, 6.34 miles.
Width of macadam, 14 feet.
Engineer's preliminary estimate of total cost, including engineering, $58,250.
Contract dated, September 19, 1907.
Work commenced, October, 1907.
Work completed, September, 1908.
Final account, $54,111.94.
Contractor, Jeremiah T. Finch.
Engineers in charge, H. J. Langlois and George R. Sherrill.

Road No. 533 extends from State road No. 138, in the village of West Chazy, northeasterly to the village of Chazy, at a point about 2,100 feet southerly from the D. & H. R. R. Approved stone was used in both courses of this road.

AMENIA–WASSAIC ROAD, NO. 537, DUTCHESS COUNTY.

Length, 4.83 miles.
Width of macadam, 14 feet.
Engineer's preliminary estimate of total cost, including engineering, $45,500.
Contract dated, July 7, 1906.
Work commenced, April, 1907.
Work completed, December, 1907.
Final account, $38,238.11.
Contractor, General Construction Company.
Engineers in charge, John R. Kaley and N. A. Taylor.

Road No. 537 extends from the road leading to Sharon station

southerly through the villages of Amenia and Wassaic to the road leading to South Amenia. Local stone was used in both courses of this road.

CHATHAM–SPENCERTOWN ROAD, NO. 540, COLUMBIA COUNTY.

Length, 4.32 miles.

Width of gravel, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $23,500.

Contract dated, July 6, 1906.

Work commenced, September, 1906.

Work completed, June, 1908.

Final account, $21,319.44.

Contractor, John W. Polcaro.

Engineers in charge, John R. Kaley and E. W. Sylvester.

Road No. 540 extends from the corporation line of the village of Chatham southeasterly towards the village of Spencertown near the property of T. F. Niles. Gravel was used as a surfacing material of this road.

SYOSSET–COLD SPRING HARBOR ROAD, NO. 545, NASSAU COUNTY.

Length, 3.22 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $39,250.

Contract dated, September 5, 1907.

Work commenced, October, 1907.

Work completed, May, 1908.

Final account, $36,558.56.

Contractor, Jeremiah T. Finch.

Engineer in charge, C. J. Peckham.

Road No. 545 extends from the Berry Hill road, in the village of Syosset, northeasterly toward the village of Cold Spring Harbor to the road leading to Laureltown, about 1,200 feet from the Suffolk county line. Trap-rock was used in both courses of this road.

NEW BRIDGE ROAD, NO. 546, NASSAU COUNTY.

Length, 6.025 miles.

Width of macadam, 13 feet.

Engineer's preliminary estimate of total cost, including engineering, $62,750.

Contract dated, January 27, 1908.

Work commenced, April, 1908.

Work completed, September, 1908.

Final account, $52,552.21.

Contractors, Twombly and Eldert.

Engineers in charge, Herbert Spencer and Edward Taylor.

Road No. 546 extends from the Long Island R. R. station in the village of Hicksville southerly to Belmore avenue. Approved stone is used in the bottom course and trap-rock in the top course of this road.

RHINEBECK–ELIZAVILLE ROAD, NO. 552, DUTCHESS COUNTY.

Length, 5.54 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $58,500.

Contract dated, September 20, 1907.

Work commenced, March, 1908.

*Work will be completed.

Final account, $51,430.30.

Contractor, John E. Consalus.

Engineers in charge, J. R. Kaley, N. A. Taylor and Paul D. Jump.

Road No. 552 extends from the corporation line of the village of Red Hook northerly toward the village of Elizaville to the Columbia county line and from the Rhinebeck–Red Hook town line northerly to the corporation line of the village of Red Hook. Approved stone was used in both courses of this road.

WOLF HILL–BERNE ROAD, NO. 566, ALBANY COUNTY.

Length, 7.34 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $71,100.

Contract dated, November 21, 1907.

Work commenced, April, 1908.

*Work will be completed.

Final account, $62,259.75.

Contractor, Morris Kantrowitz.

Engineers in charge, J. A. O'Connor and E. R. Bitler.

Road No. 566 extends from State road No. 198, near Wolf Hill, westerly through the village of East Berne to State road No. 192, in the village of Berne. Approved stone was used in both courses of this road.

MATTEAWAN–WICOPEE ROAD, NO. 567, DUTCHESS COUNTY.

Length, 4.71 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $47,100.

Contract dated, September 5, 1907.

Work commenced, October, 1907.

*Work will be completed.

Final account, $39,700.95.

Contractor, Lane Construction Company.

Engineers in charge, J. R. Kaley and N. A. Taylor.

Road No. 567 extends from the corporation line of the village of Matteawan northeasterly through the village of Glenham to the corporation line of the village of Fishkill and from the corporation line of the village of Fishkill through the village of Brinkerhoff to the East Fishkill town line. Approved stone is being used in the bottom course and trap-rock in the top course of this road.

MILLBROOK–LITHGOW ROAD, NO. 568, DUTCHESS COUNTY.

Length, 4.40 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $46,700.

Contract dated, December 3, 1907.

Work commenced, March, 1908.

*Work will be completed.

Views of the road under construction.

HIGHLAND LAKE-TOMPKINS COVE ROAD, No. 593, ROCKLAND COUNTY.

Final account, $41,524.32.

Contractor, Samuel Beskin.

Engineers in charge, J. R. Kaley, N. A. Taylor and E. G. Raynor.

Road No. 568 extends from the corporation line of the village of Millbrook northeasterly to the road leading to Wassaic in the village of Lithgow. Approved stone was used in both courses of this road.

BALDWIN PLACE–MAHOPAC ROAD, NO. 569, PUTNAM COUNTY.

Length, 5.9 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $51,500.

Contract dated, July 11, 1906.

Work commenced, August, 1906.

Work completed, December, 1907.

Final account, $46,899.35.

Contractor, Joseph Walker.

Engineers in charge, J. R. Kaley and Gorman H. Harter.

Road No. 569 extends from the northerly end of State road No. 149 westerly, northerly and northeasterly through the village of Mahopac to the fork of the roads at the southwest corner of the West Branch reservoir. Local stone was used in both courses of this road.

MOUNT KISCO–MILLWOOD ROAD, NO. 587, WESTCHESTER COUNTY.

Length, 4.39 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $45,725.

Contract dated, November 26, 1907.

Work commenced, January, 1908.

*Work will be completed.

Final account, $39,924.03.

Contractor, William F. McCabe.

Engineers in charge, J. R. Kaley and E. J. Howe.

Road No. 589 extends from the corporation line of the village of Mount Kisco westerly to State road No. 143 near the village of Millwood. Approved stone was used in both courses of this road.

NEVIS–BLUE STORE ROAD NO. 589, COLUMBIA COUNTY.

Length, 3.81 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $28,600.

Contract dated, September 1, 1906.

Work commenced, April, 1907.

Work completed, September, 1908.

Final account, $25,482.70.

Contractor, Harry S. Williams.

Engineers in charge, J. R. Kaley, E. W. Sylvester and C. E. Bruner.

Road No. 589 extends from State road No. 552, at the Dutchess county line, northerly through Nevis to the Roeliff Jansen kill near the Blue Store. Local stone was used in both courses of this road.

HIGHLAND LAKE–TOMPKINS COVE ROAD, NO. 593, ROCKLAND COUNTY.

Length, 5.88 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $154,850.

Contract dated, September 13, 1906.

Work commenced, January, 1907.

*Work will be completed.

Final account, $144,167.28.

Contractor, County of Rockland.

Engineers in charge, J. R. Kaley, F. N. Sanders and William T. Hunt.

Road No. 593 extends from the Orange county line at Highland lake southerly along the Dunderberg mountain to Tompkins Cove. Local stone was used in both courses of this road.

Views of the road under construction.

HIGHLAND LAKE-TOMPKINS COVE ROAD, NO. 593, ROCKLAND COUNTY.

WASHINGTON HOLLOW–MILLBROOK ROAD, NO. 609, DUTCHESS COUNTY.

Length, 1.63 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $16,750.

Contract dated, December 3, 1907.

Work commenced, August, 1908.

*Work will be completed.

Final account, $14,213.67.

Contractor, General Construction Company.

Engineers in charge, J. R. Kaley, N. A. Taylor and E. G. Raynor.

Road No. 609 extends from the Pleasant Valley town line easterly to the corporation line of Millbrook. Approved stone was used in both courses of this road.

CATSKILL–SOUTH CAIRO ROAD, NO. 613, GREENE COUNTY.

Length, 5.60 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $65,000.

Contract dated, November 27, 1907.

Work commenced, January, 1908.

*Work will be completed.

Final account, $58,721.30.

Contractor, John E. Consalus.

Engineers in charge, F. N. Sanders and F. McEwan Pruyn.

Road No. 613 extends from the village line of Catskill northwesterly through Leeds to the town line of Cairo. Approved stone was used in both courses of this road.

NEW LEBANON–BRAINARD ROAD, NO. 615, COLUMBIA COUNTY.

Length, 8.03 miles.

With of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $62,800.

Contract dated, September 5, 1907.

Work commenced, October, 1907.

*Work will be completed.

Final account, $54,796.55.

Contractors, Hinman and Sproul.

Engineers in charge, J. R. Kaley, E. W. Sylvester and H. E. Elles.

Road No. 615 extends from the bridge over Wyomanock creek westerly through New Lebanon and West Lebanon to the Rensselaer county line near Brainard and from the bridge over Wyomanock creek northeasterly and southeasterly to State road No. 4. Approved stone was used in both courses of this road.

ROTTERDAM JUNCTION–PATTERSONVILLE ROAD, NO. 640, SCHENECTADY COUNTY.

Length, 3.97 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $34,000.

Contract dated, September 18, 1907.

Work commenced, April, 1908.

*Work will be completed.

Final account, $30,582.35.

Contractors, Malloy and Davis.

Engineers in charge, J. A. O'Connor and F. B. Morss.

Road No. 640 extends from the Boston & Maine R. R., near Rotterdam Junction, northwesterly through the village of Pattersonville to the Montgomery county line. The original contract called for the use of approved stone in the bottom course and traprock, granite or gneiss in the top course. This was later changed by special agreement to approved local stone in the top course.

SCHENECTADY–ROTTERDAM JUNCTION ROAD, NO. 641, SCHENECTADY COUNTY.

Length, 4.76 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $40,200.

Contract dated, January 29, 1908.

Work commenced, June, 1908.

Views of a completed portion.

Highland Lake–Tompkins Cove Road, No. 503. Rockland County.

*Work will be completed.

Final account, $35,511.04.

Contractors, Malloy and Davis.

Engineers in charge, J. A. O'Connor and F. B. Morss.

Road No. 641 extends from the Schenectady city line northwesterly to the Boston & Maine R. R. near Rotterdam Junction, connecting with State road No. 640. Approved stone was used in the bottom course and limestone in the top course of this road.

STOTTVILLE ROAD, NO. 649, COLUMBIA COUNTY.

Length, 1.02 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $15,100.

Contract dated, December 18, 1907.

Work commenced, February, 1908.

Work completed, June, 1908.

Final account, $13,676.76.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, J. R. Kaley, E. W. Sylvester and L. H. Parker.

Road No. 649 extends from the Greenport town line easterly to the bridge over the Claverack creek. Approved stone was used in the bottom course and trap-rock in the top course of this road.

CLINTONVILLE–KEESEVILLE ROAD, NO. 651, CLINTON COUNTY.

Length, 5.59 miles.

Width of macadam, 14 and 15 feet.

Engineer's preliminary estimate of total cost, including engineering, $58,900.

Contract dated, December 4, 1907.

Work commenced, July, 1908.

*Work will be completed.

Final account, $55,929.98.

Contractor, Jeremiah T. Finch.

Engineers in charge, H. J. Langlois and George V. Sherrill.

Road No. 651 extends from State road No. 476 northeasterly to the corporation line of Keeseville. Approved stone was used in both courses of this road.

SANDY HILL–GLENS FALLS ROAD, NO. 656, WARREN COUNTY.

Length, 2.12 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $25,000.

Contract dated, September 5, 1907.

Work commenced, October, 1907.

*Work will be completed.

Final account, $19,476.34.

Contractors, Reardon and Byrne.

Engineers in charge, Perry Filkin and O. C. Richards.

Road No. 656 extends from the Washington county line westerly to the corporation line of the village of Glens Falls. Approved stone was used in both courses of this road.

CROTON RIVER–PEEKSKILL ROAD, NO. 657, WESTCHESTER COUNTY.

Length, 6.01 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $83,600.

Contract dated, November 26, 1907.

Work commenced, March, 1908.

*Work will be completed.

Final account, $71,017.61.

Contractor, William F. McCabe.

Engineers in charge, J. R. Kaley and L. H. Parker.

Road No. 657 extends from the Croton river northerly to the village line of Croton and from the northerly village line of Croton northerly to the village of Peekskill. Approved stone was used in the bottom course and trap-rock in the top course of this road.

COUNTY LINE–AIDEN LAIR ROAD, NO. 658, ESSEX COUNTY.

Length, 3.64 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $43,500.

Contract dated, May 21, 1908.

Work commenced, June, 1908.

*Work will be completed.

Final account, $41,150.54.

Contractor, John F. Creeden.

Engineers in charge, H. J. Langlois and Blaine Gilday.

Road No. 658 extends from Warren county line northerly through Minerva. Approved stone was used in both courses of this road.

OTEGO–WILSEY'S CORNERS ROAD, No. 676, OTSEGO COUNTY.

Length, 2.05 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $20,800.

Contract dated, November 27, 1907.

Work commenced, May, 1908.

*Work will be completed.

Final account, $17,665.93.

Contractors, J. K. Palmer and Company.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 676 extends from the corporation line of Otego northerly through Wilsey's Corners to the west branch of the Ostawa creek and from Wilsey's Corners northerly to French's Corners. Approved stone was used in the bottom course and trap-rock in the top course of this road.

MORRIS–GILBERTSVILLE ROAD, No. 678, OTSEGO COUNTY.

Length, 2.64 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $28,500.

Contract dated, December 4, 1907.

Work commenced, May, 1908.

*Work will be completed.

Final account, $24,811.99.

Contractor, S. B. Van Wagenen.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 678 extends from the corporation line of the village

of Gilbertsville northeasterly to State road No. 315 at the Morris town line. Approved stone was used in both courses of this road.

SPRING VALLEY–KNAPPS CORNERS ROAD, NO. 689, ROCKLAND COUNTY.

Length, 3.57 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,600.

Contract dated, January 30, 1908.

Work commenced, April, 1908.

*Work will be completed.

Final account, $34,842.65.

Contractor, Bellew and Merritt Company.

Engineers in charge, F. N. Sanders and William T. Hunt.

Road No. 689 extends from the corporation line of Spring Valley easterly to Knapps Corners. Approved stone was used in the bottom course and trap-rock in the top course of this road.

RIVERSIDE–CHESTERTOWN ROAD, NO. 691, WARREN COUNTY.

Length, 5.75 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $56,500.

Contract dated, January 29, 1908.

Work commenced, March, 1908.

*Work will be completed.

Final account, $52,337.11.

Contractor, C. H. Flanigan.

Engineers in charge, Perry Filkin and O. C. Richards.

Road No. 691 extends from the Hudson river at Riverside easterly to Main street, Chestertown. Approved stone was used in both courses of this road.

LOON LAKE–POTTERSVILLE–TAYLORS ROAD, NO. 692, WARREN COUNTY.

Length, 8.94 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $92,118.

Contract dated, January 30, 1908.

Work commenced, April, 1908.

*Work will be completed.

Final account, $85,547.03.

Contractor, P. F. Herlihy.

Engineers in charge, Perry Filkin and O. C. Richards.

Road No. 692 extends from the Riverside-Chestertown road, No. 691, northeasterly through Pottersville to Taylors-on-Schroon. Approved stone was used in both courses of this road.

AMITYVILLE–BABYLON ROAD, NO. 693, SUFFOLK COUNTY.

Length, 3.82 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,700.

Contract dated, January 30, 1908.

Work commenced, May, 1908.

*Work will be completed.

Final account, $33,970.60.

Contractor, Bellew and Merritt Company.

Engineers in charge, Herbert Spencer and Lowell Grossman.

Road No. 693 extends from Woods creek easterly to the corporation line of Babylon. Approved stone was used in the bottom course and trap-rock in the top course of this road.

QUOGUE–RIVERHEAD ROAD, NO. 694, SUFFOLK COUNTY.

Length, 7.69 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $84,100.

Contract dated, January 28, 1908.

Work commenced, April, 1908.

*Work will be completed.

Final account, $73,886.52.

Contractor, Robertson-Gerehart Contracting Company.

Engineer in charge, F. J. Kinney.

Road No. 694 extends from the Southampton road northerly to the corporation line of Riverhead. Approved stone was used in the bottom course and trap-rock in the top course of this road.

LIBERTY–JEFFERSONVILLE (SECTION 1) ROAD, NO. 699, SULLIVAN COUNTY.

Length, 6.57 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $71,100.

Contract dated, February 11, 1908.

Work commenced, February, 1908.

*Work will be completed.

Final account, $63,119.96.

Contractor, John F. Clancy.

Engineers in charge, F. N. Sanders and J. H. Sturdevant.

Road No. 699 extends from the corporation line of Liberty westerly through White Sulphur Springs to the Callicoon town line. Approved stone was used in both courses of this road.

LIBERTY–JEFFERSONVILLE (SECTION 2) ROAD, NO. 700, SULLIVAN COUNTY.

Length, 5.15 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $54,700.

Contract dated, January 30, 1908.

Work commenced, May, 1908.

*Work will be completed.

Final account, $43,132.25.

Contractor, Bellew and Merritt Company.

Engineers in charge, F. N. Sanders and J. H. Sturdevant.

Road No. 700 extends from the Liberty town line southwesterly through Youngsville to the Delaware town line. Approved stone was used in both courses of this road.

MALONE–BANGOR ROAD, NO. 701, FRANKLIN COUNTY.

Length, 4.51 miles.

Width of macadam, 14 feet.

View of a 5 by 8-foot box culvert.

View of a portion where grade was raised to avoid flooding each spring.

POUGHKEEPSIE-PLEASANT VALLEY ROAD, No. 549, DUTCHESS COUNTY.

Engineer's preliminary estimate of total cost, including engineering, $44,100.

Contract dated, February 4, 1908.

Work commenced, May, 1908.

*Work will be completed.

Final account, $40,843.23.

Contractor, Buckley Construction Company.

Engineers in charge, H. J. Langlois and P. L. Haas.

Road No. 701 extends from the corporation line of Malone
esterly to North Bangor. Approved stone was used in both
urses of this road.

ALONE–FORT COVINGTON (SECTION 3) ROAD, NO. 703, FRANKLIN COUNTY.

ength, 4.19 miles.

idth of macadam, 14 feet.

ngineer's preliminary estimate of total cost, including engi-
ng, $37,200.

ntract dated, January 27, 1908.

rk commenced, April, 1908.

k completed, September, 1908.

l account, $35,252.86.

l Construction Company.

Langlois and N. C. McNeil.

n West Constable northwesterly to
line. Approved stone was used in

AD, NO. 720, WASHINGTON COUNTY.

nate of total cost, including engi-

was

LLEY

Engineers in charge, Perry Filkin and O. C. Richards.

Road No. 720 extends from the corporation line of Sandy Hill easterly to Adamsville. The original contract called for the use of approved stone in both courses of this road, but was later changed to approved stone in the bottom course and trap-rock in the top course.

WHITE CREEK-COUNTY LINE ROAD, NO. 721, WASHINGTON COUNTY.

Length, 3.17 miles.

Width of macadam, 14 feet; gravel, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $29,400.

Contract dated, January 29, 1908.

Work commenced, May, 1908.

*Work will be completed.

Final account, $25,607.04.

Contractor, Edward S. Brower.

Engineers in charge, Perry Filkin and H. P. Willis.

Road No. 721 extends from Center White Creek southerly to the Rensselaer county line, also from Eagle Bridge easterly to join the same. Approved stone was used in both courses of the macadam portion of this road.

HEBRON TOWN LINE-GRANVILLE ROAD, NO. 722, WASHINGTON COUNTY.

Length, 2.06 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $22,300.

Contract dated, February 3, 1908.

Work commenced, July, 1908.

*Work will be completed.

Final account, $19,442.92.

Contractors, Hinman and Sproul.

Engineers in charge, Perry Filkin and H. P. Willis.

Road No. 722 extends from the Hebron town line northerly to State road No. 104. Approved stone was used in both courses of this road.

Before construction.

After construction.

Carmel–Kent Road, No. 570, Putnam County.

BABYLON–BAY SHORE ROAD, NO. 743, SUFFOLK COUNTY.

Length, 4.08 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $51,900.

Contract dated, January 30, 1908.

Work commenced, July, 1908.

*Work will be completed.

Final account, $40,537.05.

Contractor, Bellew and Merritt Company.

Engineers in charge, Herbert Spencer and Lowell Grossman.

Road No. 743 extends from the corporation line of Babylon easterly to Clinton avenue in the village of Bay Shore. Approved stone was used in the bottom course and trap-rock in the top course of this road.

PORT HENRY–WESTPORT ROAD, NO. 744, ESSEX COUNTY.

Length, 4.07 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $38,900.

Contract dated, May 18, 1908.

Work commenced, July, 1908.

*Work will be completed.

Final account, $26,729.75.

Contractor, Buckley Construction Company.

Engineers in charge, H. J. Langlois and William F. Farley.

Road No. 744 extends from the Moriah town line to Westport corporation line. Approved stone was used in both courses of this road.

GILBERTSVILLE VILLAGE ROAD, NO. 781, OTSEGO COUNTY.

Length, 0.8 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $10,300.

Contract dated, September 30, 1908.

Work commenced, September, 1908.

*Work will be completed.

Final account, $8,865.

Contractor, S. B. Van Wagenen.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 781 extends from State road No. 314 through the corporation of Gilbertsville to State road No. 678. Approved local stone was used in both courses of this road.

OTEGO VILLAGE ROAD, No. 782, OTSEGO COUNTY.

Length, 0.41 mile.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $5,100.

Contract dated, September 22, 1908.

Work commenced, September, 1908.

*Work will be completed.

Final account, $4,343.90.

Contractor, Robertson-Gerehart Contracting Company.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 782 extends from State road No. 676, southerly and easterly through the corporation of Otego to State road No. 675. Approved local stone was used in both courses of this road.

MILFORD VILLAGE ROAD, No. 783, OTSEGO COUNTY.

Length, 0.68 mile.

Width of macadam, 14, 15 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $7,900.

Contract dated, September 22, 1908.

Work commenced, September, 1908.

*Work will be completed.

Final account, $6,547.67.

Contractor, Robertson-Gerehart Contracting Company.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 783 extends from State road No. 674 northerly and easterly through the corporation of Milford. Approved local stone was used in the bottom course and trap-rock in the top course of this road.

Before construction.

After construction.

Carmel–Kent Road, No. 570, Putnam County.

CONTRACTS PENDING SEPTEMBER 30, 1908.

CRAIGVILLE UNDER-GRADE CROSSING, NO. 154-B, ORANGE COUNTY.

Engineer's preliminary estimate of total cost, including engineering, $15,592.

Contract dated, January 20, 1908.

Work commenced, May, 1908.

Work completed, 85 per cent.

Contractors, Mansfield and Burton.

Engineer in charge, F. N. Sanders.

Road No. 154–B is a portion of the Chester–Vail's Gate road, including the construction of an under-grade crossing of the Erie R. R. near the village of Craigville, in the town of Blooming Grove.

JOHNSTOWN–KECK'S CENTER (SECTION 2) ROAD, NO. 247, FULTON COUNTY.

Length, 4.67 miles.

Width of macadam, 12 and 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $47,100.

Contract dated, July 9, 1906.

Work commenced, April, 1907.

Work completed, 90 per cent.

Contractor, Clinton Beckwith Engineering and Contracting Co.

Engineers in charge, E. A. Lamb, R. J. Murray and William R. Trumbull.

Road No. 247 extends from State road No. 110 westerly to the old Fonda and Wheelerville plank road; and the Warren Creek-Red Schoolhouse section extends from the end of State road No. 109, at Warren Creek westerly to the road forks near the red schoolhouse. Local stone is being used for all three courses of this road.

LAKE PLEASANT–SPECULATOR ROAD, NO. 217, HAMILTON COUNTY.

Length, 3.44 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $33,900.

Contract dated, July 12, 1906.

Work commenced, August, 1906.

Work completed, 56 per cent.

Contractor, Robert Shafer.

Engineers in charge, C. C. Ahles and Harry W. Peck in 1906; E. A. Lamb, F. Edwards and George Blauvelt in 1907; George Blauvelt and E. A. Lamb in 1908.

Road No. 277 extends from the Lake Pleasant inn northeasterly to the highway intersection in Speculator. Local stone is being used in all three courses of this road.

SPRAKERS–RURAL GROVE ROAD, NO. 304, MONTGOMERY COUNTY.

Length, 5.66 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $59,600.

Contract dated, September 3, 1907.

Work commenced, May, 1908.

Work completed, 36 per cent.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, E. A. Lamb, J. B. Wright and C. H. Hoyt.

Road No. 304 extends from the town line of Canajoharie easterly through Sprakers and Currytown to Rural Grove. Approved stone is being used in both courses of this road.

CANAJOHARIE–SPROUT BROOK ROAD, NO. 345, MONTGOMERY COUNTY.

Length, 4.66 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,900.

Contract dated, December 18, 1907.

Work commenced, June, 1908.

Work completed, 46 per cent.

Construction begun.

Construction finished.

CARMEL-KENT ROAD, No. 570, PUTNAM COUNTY.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, E. A. Lamb, J. B. Wright and C. H. Hoyt.

Road No. 345 extends from State road No. 120 southwesterly through Buel to the highway intersection at Sprout Brook in the town of Canajoharie. Approved stone is being used in both courses of this road.

WEST POINT–CORNWALL ROAD, No. 411, ORANGE COUNTY.

Length, 2.31 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $225,000.

Contract dated, December 2, 1907.

Work commenced, January, 1908.

Work completed, 0.8 per cent.

Contractor, Elmore and Hamilton Contracting Company.

Engineers in charge, F. N. Sanders and R. D. Hayes.

SARATOGA–GANSEVOORT ROAD, No. 442, SARATOGA COUNTY.

Length, 6.14 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $45,700.

Contract dated, September 19, 1907.

Work commenced, April, 1908.

Work completed, 52 per cent.

Contractor, Morris Kantrowitz.

Engineers in charge, Perry Filkin and C. R. Allen, Jr.

Road No. 442 extends from the town line of Saratoga Springs northeasterly to the town line of Northumberland. Approved stone is being used in the bottom course and trap-rock in the top course of this road.

OLD FORGE–MCKEEVER ROAD, No. 462, HERKIMER COUNTY.

Length, 10.34 miles.

Width of gravel, 18 and 24 feet.

Engineer's preliminary estimate of total cost, including engineering, $126,410.

Contract dated, December 2, 1907.

Work commenced, May, 1908.

Work completed, 19 per cent.

Contractor, Spuyten Duyvil Construction Company.

Engineers in charge, E. A. Lamb, F. J. Mulvaney and C. H. Hoyt.

Road No. 462 extends from the village line of Old Forge southwesterly through the village of Fulton Chain to the Oneida county line at McKeever. The original estimate called for the surfacing of this road with gravel 18 and 24 feet in width, but was later changed by special agreement to local stone macadam, 12 feet in width.

MAYFIELD–NORTHVILLE (SECTION 2) ROAD, NO. 541, FULTON COUNTY.

Length, 6.79 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $61,700.

Contract dated, January 30, 1908.

Work commenced, June, 1908.

Work completed, 15 per cent.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, E. A. Lamb, R. J. Murray and C. H. Hoyt.

Road No. 541 extends from the northerly end of State road No. 363 northerly to the southerly end of State road No. 362. Approved stone is being used for the bottom course and granite or gneiss for the top course of this road.

POUGHKEEPSIE–PLEASANT VALLEY ROAD, NO. 549, DUTCHESS COUNTY.

Length, 6.93 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $66,450.

Construction begun.

Construction finished.

CARMEL-KENT ROAD, No. 570, PUTNAM COUNTY.

Contract dated, July 5, 1906.

Work commenced, July, 1906.

Work completed, 94 per cent.

Contractor, James E. Martin.

Engineers in charge, John R. Kaley, N. A. Taylor and R. O. Hollenbeck.

Road No. 549 extends from the Poughkeepsie city line northeasterly to station 275, near the corporation line of the village of Pleasant Valley, and from the forks of the roads near the property of Eliza Baker southeasterly to the bridge over Wappinger creek. Local stone is being used in both courses of this road.

CARMEL–KENT ROAD, NO. 570, PUTNAM COUNTY.

Length, 5.02 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $69,842.11.

Contract dated, September 20, 1907.

Work commenced, November, 1907.

Work completed, 50 per cent.

Contractor, Shanley-Morrissey, Inc.

Engineers in charge, J. R. Kaley and F. E. Reed.

Road No. 570 extends from the railroad station in the village of Carmel northeasterly to the town line between Kent and Patterson. Approved stone is being used in both courses of this road.

MILFORD CENTER–MILFORD ROAD, NO. 674, OTSEGO COUNTY.

Length, 6.52 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $77,927.30.

Contract dated, November 27, 1907.

Work commenced, January, 1908.

Work completed, 51 per cent.

Contractors, J. K. Palmer and Company.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 674 extends from the corporation line of Milford Center northerly to the corporation line of Milford and from the

easterly corporation line of Milford northeasterly to the road leading to Westville. Approved stone is being used in the bottom course and trap-rock in the top course of this road.

OTEGO–ONEONTA ROAD, NO. 675, OTSEGO COUNTY.

Length, 3.99 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $52,800.

Contract dated, November 27, 1907.

Work commenced, June, 1908.

Work completed, 28 per cent.

Contractors, J. K. Palmer and Company.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 675 extends from the village line of Otego easterly to the Oneonta town line and from the city line of Oneonta westerly to the end of State road No. 317. Approved stone is being used in the bottom course and trap-rock in the top course of this road.

EDMESTON–WEST BURLINGTON–KELSEY CORNERS ROAD, NO. 677, OTSEGO COUNTY.

Length, 4 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $43,900.

Contract dated, February 4, 1908.

Work commenced, May, 1908.

Work completed, 40 per cent.

Contractor, Delaware Construction Company.

Engineers in charge, J. A. O'Connor and J. C. Patrick.

Road No. 677 extends from Edmeston easterly through West Burlington to Kelsey Corner. Approved stone is being used in the bottom course and trap-rock in the top course of this road.

MALONE–FORT COVINGTON (SECTION 2) ROAD, NO. 702, FRANKLIN COUNTY.

Length, 6.22 miles.

Width of macadam, 14 feet.

View showing construction of a bridge.
CARMEL-KENT ROAD, No. 570, PUTNAM COUNTY.

Engineer's preliminary estimate of total cost, including engineering, $53,900.

Contract dated, January 27, 1908.

Work commenced, September, 1908.

Work completed, 21 per cent.

Contractor, Spuyten Duyvil Construction Company.

Engineers in charge, H. J. Langlois and N. C. McNeil.

Road No. 702 extends from the Malone town line northwesterly to the village of West Constable. Approved stone is being used in both courses of this road.

GREENVILLE–COXSACKIE (SECTION 2) ROAD, NO. 719, GREENE COUNTY.

Length, 5.56 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $55,100.

Contract dated, February 11, 1908.

Work commenced, May, 1908.

Work completed, 66 per cent.

Contractor, John E. Consalus.

Engineers in charge, F. N. Sanders and George Penfield.

Road No. 719 extends from the Greenville town line near Surprise southeasterly through Earlton to the Coxsackie turnpike. Approved stone is being used in both courses of this road.

TAYLORS–SCHROON VILLAGE ROAD, NO. 745, ESSEX COUNTY.

Length, 5.46 miles.

Width of macadam, 12 and 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $60,200.

Contract dated, May 18, 1908.

Work commenced, September, 1908.

Work completed, 3 per cent.

Contractor, P. F. Herlihy.

Engineer in charge, O. C. Richards.

Road No. 745 extends from the Warren county line northerly on the west shore of Schroon lake to Schroon Lake village. Approved stone is being used in both courses of this road.

AIDEN LAIR–NEWCOMB (SECTION 2) ROAD, NO. 756, ESSEX COUNTY.

Length, 7.03 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $91,400.

Contract dated, May 18, 1908.

Work commenced, July, 1908.

Work completed, 37 per cent.

Contractor, Santononi Construction Company.

Engineers in charge, H. J. Langlois and H. R. Leland.

Road No. 756 extends from the Minerva town line northwesterly to the village of Newcomb. Approved stone is being used in both courses of this road.

IMPROVEMENT OF PUBLIC HIGHWAYS.

Recapitulation of Work done to September 30, 1908.

COUNTY.	Miles under contract during year ended Sept. 30, 1908.	Miles of plans and estimates completed prior to Sept. 30, 1907.	Miles of plans and estimates completed prior to Sept. 30, 1908.	Miles of plans and estimates completed during year ended Sept. 30, 1908.	Miles of survey made during year ended Sept. 30, 1908.	Miles of contracts completed prior to Sept. 30, 1907.	Miles of contracts completed prior to Sept. 30, 1908.	Miles of contracts completed during year ended Sept. 30, 1908.
Albany	20.38	108.718	127.218	18.50	25.58	86.468	106.848	20.38
Clinton	39.00	65.07	101.02	35.95	4.91	17.66	56.66	39.00
Columbia	16.58	27.20	46.26	19.06	6.80	1.13	17.71	16.58
Delaware	4.96	15.054	20.964	5.91	4.80	4.52	9.48	4.96
Dutchess	39.62	57.021	61.001	3.98	11.92	30.303	62.993	32.69
Essex	20.20	13.06	33.26	20.20	11.33	2.64	10.35	7.71
Franklin	15.92	....	14.92	14.92	24.34	....	9.70	9.70
Fulton	23.19	75.40	75.40	....	8.89	11.73	28.13	16.40
Greene	11.16	5.62	13.63	8.01	18.33	....	5.60	5.60
Hamilton	3.44	3.44	3.44	....	3.71	....	....	....
Herkimer	46.17	118.84	118.84	....	22.97	2.64	38.47	35.83
Montgomery	17.50	112.674	112.674	....	1.37	33.654	40.834	7.18
Nassau	23.315	43.195	43.195	....	12.20	4.79	28.105	23.315
Orange	54.276	212.223	213.203	0.98	24.20	102.99	154.956	51.966
Otsego	35.407	40.337	84.907	44.57	28.83	6.84	27.737	20.897
Putnam	10.92	39.686	39.686	....	19.25	....	5.90	5.90
Rensselaer	34.92	110.24	114.36	4.12	9.41	50.79	85.71	34.92
Rockland	9.45	11.11	18.09	6.98	2.22	6.73	16.18	9.45
Saratoga	42.425	69.145	73.245	4.10	32.33	12.60	48.885	36.285
Schenectady	11.775	41.845	61.495	19.65	11.96	7.721	19.496	11.775
Suffolk	15.59	13.42	39.15	25.73	26.17	....	15.59	15.59
Sullivan	11.72	11.32	29.24	17.92	19.91	....	11.72	11.72
Ulster	52.074	167.025	167.025	....	14.96	49.77	101.844	52.074
Warren	34.11	29.29	59.00	29.71	10.80	....	34.11	34.11
Washington	10.43	33.42	46.91	13.49	10.79	7.09	17.52	10.43
Westchester	45.07	105.46	138.84	33.38	20.09	60.99	106.06	45.07
Totals	649.602	1,529.813	1,856.973	327.16	388.07	501.056	1,060.588	550.532

The appended tables show the engineering expenses of the division, the contracts completed during the fiscal year and those in force at its close.

Respectfully submitted,

L. B. HARRISON,

Division Engineer.

THE FOLLOWING STATEMENTS SHOW THE NAMES, RANK AND COMPENSATION OF ENGINEERS EMPLOYED IN THE EASTERN DIVISION OF THE DEPARTMENT OF THE STATE ENGINEER AND SURVEYOR, TOGETHER WITH INCIDENTAL EXPENSES, FOR THE FISCAL YEAR ENDED SEPTEMBER 30, 1908.

Ordinary Repairs to Canals — Erie Canal.

Chapter 577, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. B. Harrison....	Division engineer...	$3,600 per year	$1,950 00	....	$1,950 00
C. H. MacCulloch.	Resident engineer..	2,400 per year	19 36	....	19 36
J. A. O'Connor....	Resident engineer...	2,400 per year	66 00	....	66 00
Noble E. Whitford	Resident engineer...	2,400 per year	800 00	....	800 00
Charles Stark	Financial clerk.....	5 00 per day	350 00	....	350 00
Parkes D. Wendell	Estimate clerk ...	150 per month	75 00	....	75 00
B. L. Fredendall..	Stenographer.....	125 per month	500 00	....	500 00
G. L. Schillner....	Engineering draftsman	5 00 per day	1,065 00	$9 72	1,074 72
H. J. Richardson..	Rodman...........	4 00 per day	524 00	....	524 00
M. Stanley Bierce.	Inspector of masonry	4 50 per day	211 50	....	211 50
J. B. Carroll......	Laborer...........	2 00 per day	14 00	....	14 00
Wm. P. Deevey...	Laborer...........	2 00 per day	122 00	....	122 00
Thomas Sullivan..	Laborer...........	2 00 per day	40 00	....	40 00
			$5,736 86	$9 72	$5,746 58
	Incidental Expenses.				
Stationery and printing........				$283 62	
Fuel and light........				348 59	
Postage........				333 45	
Telephone and telegraph........				163 83	
Miscellaneous........				1,255 09	
					2,384 58
Total........					$8,131 16

Ordinary Repairs to Canals — Champlain Canal.

Chapter 577, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. B. Harrison ...	Division engineer...	$3,600 per year	$450 00	....	$450 00
Noble E. Whitford	Resident engineer...	2,400 per year	600 00	....	600 00
Charles Stark.....	Financial clerk.....	5 00 per day	265 00	....	265 00
Parkes D. Wendell	Estimate clerk.....	150 per month	190 00	....	190 00
C. B. Dunham, Jr.	Clerk.............	100 per month	100 00	....	100 00
L. H. Hurd......	Clerk.............	100 per month	100 00	....	100 00
J. E. Kirk........	Clerk.............	100 per month	100 00	....	100 00
B. L. Fredendall..	Stenographer....	125 per month	125 00	....	125 00
G. L. Schillner....	Engineering draftsman	5 00 per day	130 00	....	130 00
H. J. Richardson.	Rodman	4 00 per day	120 00	....	120 00
M. Stanley Bierce.	Inspector of masonry	4 50 per day	117 00	....	117 00
Wm. P. Deevey...	Laborer..........	2 00 per day	62 00	....	62 00
Wm. Walters.....	Laborer..........	2 00 per day	40 00	....	40 00
			$2,399 00	....	$2,399 00
	Incidental Expenses				
Stationery and printing........				$81 79	
Fuel and light........				342 06	
Postage........				108 00	
Telephone and telegraph........				3 25	
Miscellaneous........				934 74	
					1,469 84
Total........					$3,868 84

Construction of Barge Canal — Head Office Account.

Chapter 147, Laws 1903; Chapter 143, Laws 1905; Chapter 172, Laws 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Frederick Skene	State engineer and surveyor	$5,000 per year	....	$65 00	$65 00
W. R. Hill	Special deputy state engineer	5,000 per year	$4,999 92	1,199 65	6,199 57
W. B. Landreth	Special resident engineer	4,500 per year	4,500 00	200 42	4,700 42
H. D. Alexander	Resident engineer	3,000 per year	2,925 00	192 41	3,117 41
Robert E. Horton	Resident engineer	2,700 per year	2,508 87	2,014 58	4,523 45
O. F. Bellows	Resident engineer	2,400 per year	2,362 00	27 50	2,389 50
James Burden	Resident engineer	2,400 per year	762 00	1 30	763 30
George F. Chism	Resident engineer	2,400 per year	2,389 00	336 23	2,725 23
Philip H. Dater	Resident engineer	2,400 per year	800 00	7 21	807 21
R. S. Greenman	Resident engineer	2,400 per year	2,178 00	501 99	2,679 99
C. H. MacCulloch	Resident engineer	2,400 per year	569 03	....	569 03
J. A. O'Connor	Resident engineer	2,400 per year	100 00	8 00	108 00
E. J. Pickwick	Resident engineer	2,400 per year	492 23	48 59	540 82
Noble E. Whitford	Resident engineer	2,400 per year	1,000 00	9 80	1,009 80
W. R. Davis	Chief bridge designer	3,900 per year	3,537 56	47 03	3,584 59
J. G. Peck	Assistant chief bridge designer	3,000 per year	2,926 94	27 93	2,954 87
John Bartholomew	Bridge designer	175 per month	708 77	....	708 77
E. A. Brainard	Bridge designer	175 per month	2,082 50	....	2,082 50
G. M. Braune	Bridge designer	175 per month	1,538 03	11 85	1,549 88
J. C. Green	Bridge designer	175 per month	2,088 33	....	2 088 33
C. N. Haggert	Bridge designer	175 per month	1,512 12	....	1,512 12
A H. Higley	Bridge designer	175 per month	1,603 22	62 53	1,665 75
Lemuel Holmes	Bridge designer	175 per month	970 22	....	970 22
Harold Levy	Bridge designer	175 per month	1,315 52	....	1,315 52
H. D. Miller	Bridge designer	175 per month	1,624 10	37 74	1,661 84
H. J. Scheuermann	Bridge designer	175 per month	1,973 92	1 80	1,975 72
A. G. Hayden	Bridge designer	160 per month	1,488 80	4 95	1,493 75
R. C. Bastress	Bridge designer	150 per month	890 33	....	890 33
Emil Bie	Bridge designer	150 per month	1,093 06	....	1,093 06
H. E. Brainard	Bridge designer	150 per month	1,115 50	....	1,115 50
E. G. Purver	Bridge designer	150 per month	1,006 45	....	1,006 45
J. H. B. Altdoerffer	Bridge designer	125 per month	1,380 65	....	1,380 65
G. H. Bugenhagen	Bridge designer	125 per month	570 53	....	570 53
J. P. Considine	Bridge designer	125 per month	1,027 58	....	1,027 58
H. E. Helfand	Bridge designer	125 per month	1,384 89	....	1,384 89
F. A. Hermans	Bridge designer	125 per month	1,056 45	36 05	1,092 50
A. E. Hill	Bridge designer	125 per month	713 71	....	713 71
F. W. Leonhard	Bridge designer	125 per month	99 99	....	99 99
E. L. Pierce	Bridge designer	125 per month	1,301 88	....	1,301 88
J. C. Podmore	Bridge designer	125 per month	1,487 90	....	1,487 90
E. G. Semon	Bridge designer	125 per month	1,351 20	....	1,351 20
C. H. Wood	Bridge designer	125 per month	875 00	....	875 00
Harry N. Peck	Bridge draftsman	115 per month	230 00	....	230 00
Wm. P. Falkenstein	Bridge draftsman	110 per month	1,270 67	....	1,270 67
G. E. Maynard	Bridge draftsman	110 per month	1,032 74	....	1,032 74
R. M. Wheeler	Bridge draftsman	110 per month	583 58	....	583 58
F. B. Martin	Bridge draftsman	100 per month	353 33	....	353 33
A. C. Miller	Bridge draftsman	100 per month	202 36	....	202 36
E. E. Briggs	Junior bridge draftsman	100 per month	1,147 42	....	1,147 42
G. H. Matthews	Provisional bridge designer	125 per month	154 47	....	154 47
L. R. Medcalf	Provisional bridge designer	125 per month	327 56	....	327 56
C. R. Vanneman	Provisional bridge designer	125 per month	23 50	....	23 50
Oscar Van Voigntlander	Provisional bridge designer	125 per month	18 40	....	18 40
C. E. Haywood	Provisional bridge draftsman	100 per month	284 62	....	284 62
J. E. Kingsley	Provisional bridge draftsman	100 per month	95 16	....	95 16
C. M. Luther	Provisional bridge draftsman	100 per month	274 94	....	274 94
G. F. Mueden	Provisional bridge draftsman	100 per month	268 92	....	268 92
W. H. Hale	Provisional jr. bridge draftsman	75 00 per month	72 50	....	72 50
F. E. Winter	Provisional jr. bridge draftsman	75 00 per month	93 39	....	93 39
D. A. Watt	Expert designer of movable dams and supervising engineer	325 per month	3,889 52	597 56	4,487 08
George F. Stickney	Expert lock designer and supervising engineer	325 per month	3,900 00	320 43	4,220 43
R. R. Stuart	Engineer of water-supply	225 per month	2,925 00	172 66	3,097 66
C. H. O'Neill	Confidential assistant	333 33 per mo.	833 32	142 53	975 85
Luke A. Keenan	Financial clerk and auditor	233 33 per mo.	1,283 31	....	1,283 31
James E. Kirk	Clerk	125 per month	150 00	....	150 00
J. C. Guffin	Clerk	100 per month	1,200 00	....	1,200 00
Chas. B. Dunham, Jr.	Clerk	75 00 per month	75 00	....	75 00
John T. Gorman	Clerk	75 00 per month	773 00	....	773 00
George W. Ruso	Clerk	75 00 per month	825 00	....	825 00
John E. F. Minnock	Clerk	60 00 per month	60 00	....	60 00

Construction of Barge Canal — Head Office Account —(Cont'd).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Edgar S. Palmer	Junior clerk	$40 00 per month	$289 22		$289 22
H. W. Cowlbeck	Stenographer	125 per month	1,425 00		1,425 00
B. L. Fredendall	Stenographer	125 per month	250 00		250 00
Nelle Clark	Stenographer	83 33 per month	916 63		916 63
Cleora Van Vleck	Stenographer	83 33 per month	999 96		999 96
Adele Hallenbeck	Stenographer	76 00 per month	674 00		674 00
Helen E. Brown	Stenographer	75 00 per month	150 00		150 00
L. J. Mulhauser	Stenographer	75 00 per month	195 97		195 97
Georgiana Pflaum	Stenographer	75 00 per month	225 00		225 00
S. C. MacNeill	Stenographer	60 00 per month	60 00		60 00
Margaret J. Buckley	Stenographer	50 00 per month	173 98		173 98
May G. Harrington	Stenographer	50 00 per month	256 67		256 67
Grace Haswell	Stenographer	50 00 per month	233 87		233 87
Hannah B. Oppenheim	Stenographer	50 00 per month	134 48		134 48
John J. Tobin	Stenographer	50 00 per month	619 35		619 35
Grace E. Thompson	Temporary stenographer	70 00 per month	72 26		72 26
Bridgie T. Kelly	Temporary stenographer	50 00 per month	62 90		62 90
E. G. Blessing	Engineering draftsman	5 00 per day	1,550 00		1,550 00
B. O. Burgin	Engineering draftsman	5 00 per day	135 00		135 00
J. M. Friedland	Engineering draftsman	5 00 per day	1,402 00		1,402 00
J. K. Lloyd	Engineering draftsman	5 00 per day	1,095 00		1,095 00
George L. Schillner	Engineering draftsman	5 00 per day	380 00		380 00
Leo B Westfall	Engineering draftsman	5 00 per day	1,169 03		1,169 03
W. J. Picard	Engineering draftsman	4 50 per day	1,390 50		1,390 50
E. E. Brandow	Engineering draftsman	4 00 per day	1,133 35		1,133 35
James A. Galvin	Engineering draftsman	4 00 per day	88 00	$5 36	93 36
L. Lee Hadley	Engineering draftsman	4 00 per day	104 00		104 00
J. D. McCormick, Jr.	Engineering draftsman	4 00 per day	1,084 13		1,084 13
Angelo P. Mussi	Engineering draftsman	4 00 per day	208 00		208 00
E. J. Sipple	Engineering draftsman	4 00 per day	452 00		452 00
J. L. Southworth	Engineering draftsman	4 00 per day	996 00		996 00
H. H. Stickney, Jr	Engineering draftsman	4 00 per day	560 00		560 00
Rupert Sturtevant	Engineering draftsman	4 00 per day	1,232 00		1,232 00
A. T. Thayer	Engineering draftsman	4 00 per day	1,256 00		1,256 00
F. E. Blake	Mechanical eng'r and draftsman	175 per month	1,955 67	7 04	1,962 71
J. A. Jensen	Mechanical draftsman	75 00 per month	42 50		42 50
W. S. Klos	Mechanical draftsman	75 00 per month	57 50		57 50
Charles V. Wurcke	Mechanical draftsman	75 00 per month	370 32		370 32
John J. Cosgrave	Architectural draftsman	125 per month	354 84		354 84
R. R. Shearer	Architectural draftsman	100 per month	1,200 00		1,200 00
Theron Ainsworth	Tracer	75 00 per month	900 00		900 00
Charles A. Lamphere	Tracer	75 00 per month	562 90		562 90
John A. Pritchard	Tracer	75 00 per month	900 00		900 00
S. T. Vosburgh	Tracer	75 00 per month	96 77		96 77
Frederic A. Cordes	Tracer	50 00 per month	30 00		30 00
John H. Forth	Tracer	50 00 per month	200 00		200 00
Bernard Gazier	Tracer	50 00 per month	576 00		576 00
Maximillian Komow	Tracer	50 00 per month	285 00		285 00
Charles T. Kniskern, Jr	Tracer	50 00 per month	175 00		175 00
G. H. Knott	Tracer	50 00 per month	38 33	6 18	44 51
Philip R. Murray	Tracer	50 00 per month	272 24		272 24
Albert E. Upson	Tracer	50 00 per month	59 18		59 18
L. L. Tiffany	Provisional mechanical draftsman	100 per month	225 81		225 81
Charles Messina	Tracer	50 00 per month	77 24		77 24
Theron M. Ripley	First assistant engineer	7 00 per day	210 00	52 25	262 25
E. Auderberg	Assistant engineer	6 00 per day	1,782 00	1 45	1,783 45
F. C. Ashley	Assistant engineer	6 00 per day	1,790 00	10 65	1,800 65
F. A. Biggi	Assistant engineer	6 00 per day	888 00	8 29	896 29
Clark Brown	Assistant engineer	6 00 per day	1,848 00		1,848 00
C. R. Chase	Assistant engineer	6 00 per day	1,854 00	13 84	1,867 84
N. S. Coulter	Assistant engineer	6 00 per day	1,956 00	46 75	2,002 75
E. J. Doyle	Assistant engineer	6 00 per day	1,836 00	5 74	1,841 74
F. M. Eames	Assistant engineer	6 00 per day	1,842 00		1,842 00
G. Edward Gibson	Assistant engineer	6 00 per day	1,860 00		1,860 00
F. D. Hendricks	Assistant engineer	6 00 per day	726 00		726 00
L. S. Hulburd	Assistant engineer	6 00 per day	876 00		876 00
L. W. Irish	Assistant engineer	6 00 per day	1,146 00		1,146 00
Charles Kiehm	Assistant engineer	6 00 per day	1,758 00	6 41	1,764 41
John H. McElroy	Assistant engineer	6 00 per day	2,148 00	104 23	2,252 23
William R. Neely	Assistant engineer	6 00 per day	1,302 00	2 35	1,304 35
J. P. Newton	Assistant engineer	6 00 per day	1,854 00	441 18	2,295 18
P. W. O'Grady	Assistant engineer	6 00 per day	1,290 00	49 43	1,339 43

Construction of Barge Canal — Head Office Account —(Cont'd).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
George H. Penfield	Assistant engineer	$6 00 per day	$954 00		$954 00
R. E. Phillips	Assistant engineer	6 00 per day	1,826 00		1,826 00
B. W. Rosekrans	Assistant engineer	6 00 per day	1,854 00		1,854 00
A. D. Sanderson	Assistant engineer	6 00 per day	1,884 00	$242 54	2,126 54
H. O. Schermerhorn	Assistant engineer	6 00 per day	1,986 00	3 35	1,989 35
W. H. Slingerland, Jr.	Assistant engineer	6 00 per day	1,848 00	15 60	1,863 60
Howard E. Smith	Assistant engineer	6 00 per day	168 00		168 00
A. E. Steere	Assistant engineer	6 00 per day	276 00	4 49	280 49
E. W. Sylvester	Assistant engineer	6 00 per day	462 00		462 00
Thomas R. Tetley, Jr.	Assistant engineer	6 00 per day	1,848 00		1,848 00
G. G. Underhill	Assistant engineer	6 00 per day	786 00	1 48	787 48
H. A. Weeks	Assistant engineer	6 00 per day	1,860 00		1,860 00
W. G. Wildes	Assistant engineer	6 00 per day	1,884 00	12 78	1,896 78
F. B. Williams	Assistant engineer	6 00 per day	90 00		90 00
B. J. Lowenstein	Assistant engineer	5 50 per day	1,684 00		1,618 C0
L. Bartlett	Assistant engineer	5 00 per day	330 00		330 00
F. S. Carlisle	Assistant engineer	5 00 per day	1,529 00		1,529 00
Dewitt H. Daley	Assistant engineer	5 00 per day	1,540 00		1,540 00
R. G. Finch	Assistant engineer	5 00 per day	1,022 00		1,022 00
H. A. Gehring	Assistant engineer	5 00 per day	255 00	2 96	257 96
H. W. Hale	Assistant engineer	5 00 per day	981 50		981 50
Royden L. Holt	Assistant engineer	5 00 per day	1,540 00		1,540 00
F. C. Koerner	Assistant engineer	5 00 per day	1,476 00		1,476 00
C. L. McClelland	Assistant engineer	5 00 per day	30 00		30 00
Charles W. Morris, Jr.	Assistant engineer	5 00 per day	1,540 00		1,540 00
E. C. Olcott	Assistant engineer	5 00 per day	1,570 00		1,570 00
Max W. Wolff	Assistant engineer	5 00 per day	10 00		10 00
R. J. Lyon	Leveler	5 00 per day	150 00		150 00
G. G. Sweet	Leveler	5 00 per day	1,540 00		1,540 00
H. T. Arnold	Leveler	4 50 per day	432 00		432 00
Arthur T. Clark	Leveler	4 50 per day	1,185 00		1,185 00
F. H. Flint	Leveler	4 50 per day	661 50		661 50
John F. Greathead	Leveler	4 50 per day	1,301 00		1,301 00
Daniel W. Overocker	Leveler	4 50 per day	121 50		121 50
C. H. Pearce	Leveler	4 50 per day	216 00	124 88	340 88
LeRoy S. Richard	Leveler	4 50 per day	1,174 50		1,174 50
T. L. Watkins	Leveler	4 50 per day	1,400 50		1,400 50
C. E. Weed	Leveler	4 50 per hay	162 00		162 00
Frank Roberts	Leveler	4 00 per day	1,180 00	8 27	1,188 27
W. E. Darrow	Rodman	3 50 per day	87 50		87 50
George H. Jones	Rodman	3 50 per day	280 00		280 00
George B. Kelly	Rodman	3 50 per day	539 00		539 00
A. R. Patchke	Rodman	3 50 per day	892 50	2 93	895 43
C. E. Anderson	Chainman	3 00 per day	75 00		75 00
W. H. Dodd	Chainman	3 00 per day	907 50	9 07	916 57
E. C. Niles	Chainman	3 00 per day	933 00		933 00
H. V. Button	Chainman	2 50 per day	570 00		570 00
W. J. Craig	Chainman	2 50 per day	17 50		17 50
George F. Deutschbein	Chainman	2 50 per day	360 00		360 00
Joseph T. Murphy	Chainman	2 50 per day	382 50		382 50
H. B. Parker	Chainman	2 50 per day	162 50		162 50
F. B. Watkins	Chainman	2 50 per day	80 00		80 00
E. V. Allendorph	Inspector of masonry	5 00 per day	542 00	55 73	597 73
M. Stanley Bierce	Inspector of masonry	4 50 per day	662 50	1 75	664 25
W. W. Barclay	Inspector of masonry	4 00 per day	60 00		60 00
Ralph E. Bierce	Inspector of masonry	4 00 per day	1,040 00		1,040 00
J. M. Saylor	Inspector of masonry	4 00 per day	520 00		520 00
J. E. Myers	Inspector of highways	4 50 per day	342 00	17 08	359 08
H. S. Mattimore	Inspector of highways	4 00 per day	108 00		108 00
E. C. Altenburg	Inspector of highways	3 50 per day	595 50		595 50
R. W. Fivey	Inspector of highways	3 50 per day	803 00		803 00
Hugh Henderson	Inspector of highways	3 50 per day	1,026 00		1,026 00
E. F. Weeks	Inspector of highways	3 50 per day	1,081 50		1,081 50
Frank M. Hill	Title maker	100 per month	1,062 00		1,062 00
E. H. Wetsel	Foreman of public works	4 00 per day	1,258 00	16 33	1,274 33
Fred B. Craft	Boatman	3 00 per day	33 00		33 00
George Morgan	Boatman	3 00 per day	99 00		99 00
Edwin M. Chamberlain	Watchman	80 00 per month	547 10		547 10
Charles A. Taggart	Watchman	70 00 per month	18 67		18 67
Ammie Bailey	Axeman and office assistant	2 00 per day	594 00	8 40	602 40
Michael E. Baker	Axeman and office assistant	2 00 per day	326 00		326 00

Construction of Barge Canal — Head Office Account —(Concl'd).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
LeRoy Barner	Axeman and office assistant	$2 00 per day	$274 00	....	$274 00
Kenneth Boutelle	Axeman and office assistant	2 00 per day	200 00	....	200 00
Thomas E. Bowen	Axeman and office assistant	2 00 per day	686 00	....	686 00
John S. Burns	Axeman and office assistant	2 00 per day	306 00	....	306 00
J. Garner Bushnell	Axeman and office assistant	2 00 per day	368 00	....	368 00
L. F. Cashman	Axeman and office assistant	2 00 per day	102 00	....	102 00
D. B. Fitzgerald	Axeman and office assistant	2 00 per day	56 00	....	56 00
M. D. Hanlon	Axeman and office assistant	2 00 per day	68 00	....	68 00
Byron Houghtaling	Axeman and office assistant	2 00 per day	464 00	....	464 00
James J. Murnane	Axeman and office assistant	2 00 per day	52 00	....	52 00
Thomas Ryan, Jr	Axeman and office assistant	2 00 per day	106 00	....	106 00
William J. Ryan	Axeman and office assistant	2 00 per day	54 00	$1 91	55 91
John H. Boyland	Laborer	2 00 per day	316 00	....	316 00
Thomas Brennen	Laborer	2 00 per day	228 00	....	228 00
J. J. Brown	Laborer	2 00 per day	56 00	....	56 00
Peter Buchanan	Laborer	2 00 per day	106 00	....	106 00
John B. Carroll	Laborer	2 00 per day	104 00	....	104 00
Thomas Clancy	Laborer	2 00 per day	316 00	....	316 00
John M. Connolly	Laborer	2 00 per day	182 00	....	182 00
William P. Deevey	Laborer	2 00 per day	202 00	....	202 00
John E. Dempsey	Laborer	2 00 per day	368 00	....	368 00
T. C. Duggan	Laborer	2 00 per day	208 00	....	208 00
H. C. Duryee	Laborer	2 00 per day	26 00	....	26 00
Stephen Feenan	Laborer	2 00 per day	552 00	....	552 00
P. J. Gaffney	Laborer	2 00 per day	136 00	....	136 00
L. L. Gowdy	Laborer	2 00 per day	....	16 43	16 43
Alex Greenwald	Laborer	2 00 per day	210 00	....	210 00
Frank Hanna	Laborer	2 00 per day	228 00	....	228 00
W. A. Hanrahan	Laborer	2 00 per day	52 00	....	52 00
George E. Koonmen	Laborer	2 00 per day	194 00	....	194 00
Henry Koreman	Laborer	2 00 per day	126 00	....	126 00
Simeon Lodewick	Laborer	2 00 per day	400 00	....	400 00
John M. Macdonald	Laborer	2 00 per day	106 00	....	106 00
Howard S. Pattee	Laborer	2 00 per day	78 00	....	78 00
James L. Quinn	Laborer	2 00 per day	264 00	....	264 00
Dennis Roach	Laborer	2 00 per day	256 00	....	256 00
Henry Sager	Laborer	2 00 per day	106 00	....	106 00
H. J. Soules	Laborer	2 00 per day	630 00	....	630 00
Cuyler Ten Eyck	Laborer	2 00 per day	106 00	....	106 00
Michael Tierney	Laborer	2 00 per day	628 00	....	628 00
A. F. Wilson	Laborer	2 00 per day	226 00	....	226 00
			$[illegible]08,951 28	$7,382 9[illegible]	$[illegible]16,324 24

Incidental Expenses.

Instruments and appliances	$826 42	
Office rent	2,652 87	
Fuel and light	212 82	
Stationery and printing	6,261 47	
Postage	661 02	
Telephone and telegraph	2,412 48	
Miscellaneous	14,569 97	
		27,597 05
Total		$243,931 29

Construction of Barge Canal — Erie Canal.

Chapter 147, Laws 1903; Chapter 143, Laws 1905; Chapter 172, Laws 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. B. Harrison	Division engineer	$3,600 per year	$800 00	$20 00	$820 00
Philip H. Dater	Resident engineer	2,400 per year	1,400 00	318 91	1,718 91
C. H. MacCulloch	Resident engineer	2,400 per year	1,779 61	282 29	2,061 90
E. J. Pickwick	Resident engineer	2,400 per year	1,896 77	343 63	2,240 40
C. Arthur Poole	Resident engineer	2,400 per year	2,400 00	89 25	2,489 25
S. M. Savage	Resident engineer	2,400 per year	2,400 00	256 43	2,656 43
F. P. Williams	Resident engineer	2,400 per year	2,400 00	352 19	2,752 19
John Bartholomew	Bridge designer	175 per month	....	8 03	8 03
Harry N. Peck	Bridge draftsman	115 per month	783 69	....	783 69
Charles Stark	Financial clerk	5 00 per day	525 00	....	525 00
Parkes D. Wendell	Estimate clerk	150 per month	375 00	18 19	393 19
L. H. Hurd	Clerk	100 per month	462 50	....	462 50
Nelle Clark	Stenographer	83 33 per month	83 33	....	83 33
B. E. Kirchner	Stenographer	50 00 per month	188 33	....	188 33
Mary O'Connor	Stenographer	50 00 per month	19 51	....	19 51
V. G. Sweet	Stenographer	50 00 per month	145 99	....	145 99
L. L. Watkins	Stenographer	50 00 per month	300 00	....	300 00
E. H. Bourne	Engineering draftsman	5 00 per day	1,485 00	....	1,485 00
W. R. Gordon	Engineering draftsman	5 00 per day	65 00	....	65 00
Ford W. Harris	Engineering draftsman	4 00 per day	852 00	....	852 00
F. W. Madigan	Engineering draftsman	4 00 per day	220 00	....	220 00
R. H. Warren	Engineering draftsman	4 00 per day	32 00	....	32 00
F. A. Cordes	Tracer	50 00 per month	150 00	....	150 00
William L. Jones	Tracer	50 00 per month	96 18	90	97 08
Fred C. Davis	First assistant engineer	7 00 per day	189 00	....	189 00
Edward Anderberg	Assistant engineer	6 00 per day	60 00	....	60 00
Lewis Bartlett	Assistant engineer	6 00 per day	1,431 00	130 53	1,561 53
E. J. Becker	Assistant engineer	6 00 per day	1,805 00	73 22	1,878 22
D. E. Bellows	Assistant engineer	6 00 per day	1,802 00	655 91	2,457 91
F. W. Harris	Assistant engineer	6 00 per day	1,896 00	74 53	1,970 53
E. D. Hendricks	Assistant engineer	6 00 per day	1,146 00	236 55	1,382 55
Edwin Hilborn	Assistant engineer	6 00 per day	1,884 00	1,066 08	2,950 08
L. S. Hulburd	Assistant engineer	6 00 per day	1,026 00	7 78	1,033 78
M. E. James	Assistant engineer	6 00 per day	2,034 00	315 47	2,349 47
J. B. Maguire	Assistant engineer	6 00 per day	1,807 00	....	1,807 00
I. S. Matlaw	Assistant engineer	6 00 per day	1,799 00	325 73	2,124 73
C. L. McClelland	Assistant engineer	6 00 per day	1,695 00	21 23	1,716 23
George I. Oakley	Assistant engineer	6 00 per day	1,428 00	401 82	1,829 82
P. W. O'Grady	Assistant engineer	6 00 per day	18 00	1 95	19 95
A. E. Steere	Assistant engineer	6 00 per day	1,746 00	47 82	1,793 82
G. G. Underhill	Assistant engineer	6 00 per day	216 00	....	216 00
W. H. Van Wie	Assistant engineer	6 00 per day	162 00	18 68	180 68
R. Hopkins	Assistant engineer	5 50 per day	445 50	....	445 50
A. G. Austin	Assistant engineer	5 00 per day	1,675 00	....	1,675 00
J. C. Bell	Assistant engineer	5 00 per day	1,085 00	274 19	1,359 19
C. A. Holmquist	Assistant engineer	5 00 per day	1,569 50	....	1,569 50
O. F. Lewis	Assistant engineer	5 00 per day	1,615 00	38 62	1,653 62
E. P. Neuschwander	Assistant engineer	5 00 per day	610 00	67 52	677 52
H. R. Robbins	Assistant engineer	5 00 per day	215 00	5 90	220 90
W. J. Weigmann	Assistant engineer	5 00 per day	1,415 00	118 83	1,533 83
Oscar Hasbrouck	Leveler	5 00 per day	1,630 00	....	1,630 00
C. G. Ranney	Leveler	5 00 per day	1,571 50	5 60	1,577 10
J. L. Sawyer	Leveler	5 00 per day	1,447 50	....	1,447 50
H. T. Arnold	Leveler	4 50 per day	467 00	....	467 00
E. M. Babcock	Leveler	4 50 per day	166 50	....	166 50
S. R. Bellows	Leveler	4 50 per day	693 00	....	693 00
H. W. Benkart	Leveler	4 50 per day	832 50	....	832 50
R. M. Bennett	Leveler	4 50 per day	112 50	....	112 50
L. L. Graham	Leveler	4 50 per day	76 50	....	76 50
M. W. Grimes	Leveler	4 50 per day	684 00	....	684 00
C. L. Hayward	Leveler	4 50 per day	693 00	....	693 00
Eustace Hulsapple	Leveler	4 50 per day	1,241 50	....	1,241 50
Grant Huntley	Leveler	4 50 per day	256 50	....	256 50
C. E. Weed	Leveler	4 50 per day	1,296 00	48 56	1,344 56
J. D. Williams	Leveler	4 50 per day	418 50	....	418 50
W. E. Weller	Leveler	4 50 per day	22 50	6 78	29 28
D. A. Young	Leveler	4 50 per day	414 00	....	414 00
C. S. Deitz	Rodman	4 00 per day	1,142 00	....	1,142 00
H. D. Richardson	Rodman	4 00 per day	456 00	155 00	611 00
S. R. Tighe	Rodman	4 00 per day	369 00	....	369 00
C. L. Baldwin	Rodman	3 50 per day	203 00	....	203 00
J. S. Bixby	Rodman	3 50 per day	315 00	....	315 00

Construction of Barge Canal — Erie Canal —(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Otto Brown	Rodman	$3 50 per day	$31 50		$31 50
F. W. Burleigh	Rodman	3 50 per day	224 00		224 00
W. R. Cornell	Rodman	3 50 per day	199 50		199 50
J. A. Glominski	Rodman	3 50 per day	210 00		210 00
E. W. Goff	Rodman	3 50 per day	525 00		525 00
George B. Kelley	Rodman	3 50 per day	444 50		444 50
A. R. Patchke	Rodman	3 50 per day	87 50	$2 95	90 45
J. M. Prior	Rodman	3 50 per day	185 50		185 50
W. C. Rich	Rodman	3 50 per day	532 00		532 00
J. J. Schworm	Rodman	3 50 per day	192 50		192 50
H. S. Silvester	Rodman	3 50 per day	31 50		31 50
R. B. Smith	Rodman	3 50 per day	511 00		511 00
George Van Nostrand	Rodman	3 50 per day	423 50		423 50
E. L. Waterman	Rodman	3 50 per day	192 50		192 50
C. H. Adams	Chainman	3 00 per day	909 00		909 00
C E. Anderson	Chainman	3 00 per day	492 00		492 00
F. E. Gillen	Chainman	3 00 per day	961 65		961 65
H. P. O'Bryan	Chainman	3 00 per day	791 00		791 00
F. B. Stoddard	Chainman	3 00 per day	888 50		888 50
F. C. Armstrong	Chainman	2 50 per day	617 50		617 50
W. J. Craig	Chainman	2 50 per day	140 00		140 00
E. C. Dollard	Chainman	2 50 per day	432 50		432 50
J. L. Doyle	Chainman	2 50 per day	137 50		137 50
Jacob Gadlowitz	Chainman	2 50 per day	345 00		345 00
Paul G. Hovey	Chainman	2 50 per day	120 00		120 00
A. G. Horne	Chainman	2 50 per day	130 00		130 00
H. A. Joseph	Chainman	2 50 per day	192 50		192 50
Thomas J. Loonie	Chainman	2 50 per day	907 50		907 50
John Lyons	Chainman	2 50 per day	130 00		130 00
L. Y. Meneely	Chainamn	2 50 per day	5 00		5 00
E. F. Morey	Chainman	2 50 per day	100 00		100 00
W. W. Moyer	Chainman	2 50 per day	530 00		530 00
A. R. Mulligan	Chainman	2 50 per day	390 00		390 00
E. S. Overbaugh	Chainman	2 50 per day	152 50		152 50
L. P. Stutz	Chainman	2 50 per day	145 00		145 00
F. L. Teall	Chainman	2 50 per day	772 50		772 50
C. B. Tebo	Chainman	2 50 per day	402 50		402 50
J. R. Tighe	Chainman	2 50 per day	22 50		22 50
J. A. Young	Chainman	2 50 per day	772 50		772 50
E. V. Allendorph	Inspector of masonry	5 00 per day	98 00	19 23	117 23
Thomas R. McCann	Inspector of masonry	5 00 per day	493 00		493 00
W. W. Barclay	Inspector of masonry	4 00 per day	800 00		800 00
J. A. Cahalin	Inspector of masonry	4 00 per day	304 00		304 00
L. C. Dedrick	Inspector of masonry	4 00 per day	384 00		384 00
T. F. Fagan	Inspector of masonry	4 00 per day	640 00		640 00
H. B. Finan	Inspector of masonry	4 00 per day	404 00		404 00
J. E. Foote	Inspector of masonry	4 00 per day	636 00		636 00
A. W. Gillis	Inspector of masonry	4 00 per day	196 00		196 00
G. M. Harrer	Inspector of masonry	4 00 per day	1,320 00		1,320 00
H. E. Hillier	Inspector of masonry	4 00 per day	164 00		164 00
H. T. Hughes	Inspector of masonry	4 00 per day	916 00		916 00
O. J. Humphrey	Inspector of masonry	4 00 per day	364 00		364 00
E. L. Keeler	Inspector of masonry	4 00 per day	1,304 00		1,304 00
H. L. Kennedy	Inspector of masonry	4 00 per day	196 00		196 00
W. H. H. Klinkhart	Inspector of masonry	4 00 per day	1,304 00		1,304 00
W. P. Lynch	Inspector of masonry	4 00 per day	148 00		148 00
S. Y. MacGregor	Inspector of masonry	4 00 per day	713 00		713 00
J. E. Magowan	Inspector of masonry	4 00 per day	608 00		608 00
T. J. Mangin	Inspector of masonry	4 00 per day	348 00		348 00
T. M. Oliver	Inspector of masonry	4 00 per day	616 00		616 00
James Sim	Inspector of masonry	4 00 per day	1,268 00		1,268 00
J. M. Taylor	Inspector of masonry	4 00 per day	776 00		776 00
W. A. Walter	Inspector of masonry	4 00 per day	236 00		236 00
W. A. Whitman	Inspector of masonry	4 00 per day	80 00		80 00
Alfred Evans	Inspector of public works	4 50 per day	315 00		315 00
H. W. Breen	Inspector of highways	4 50 per day	522 00		522 00
J. L. Bacon	Axeman and office assistant	2 00 per day	170 00		170 00
A. J. Banker	Axeman and office assistant	2 00 per day	302 00		302 00
A. F. Bayly	Axeman and office assistant	2 00 per day	82 00		82 00
H. A. Bayly	Axeman and office assistant	2 00 per day	80 00		80 00
E. A. Blakeslee	Axeman and office assistant	2 00 per day	286 00		286 00
E. J. Bradley	Axeman and office assistant	2 00 per day	620 00		620 00

Construction of Barge Canal — Erie Canal —(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
J. G. Bushnell	Axeman and office assistant	$2 00 per day	$244 00	....	$244 00
R. W. Crawford	Axeman and office assistant	2 00 per day	80 00	....	80 00
E. J. Daley	Axeman and office assistant	2 00 per day	282 00	....	282 00
W. A. Dawson	Axeman and office assistant	2 00 per day	156 00	....	156 00
R. E. Faust	Axeman and office assistant	2 00 per day	78 00	....	78 00
L. F. Hichman	Axeman and office assistant	2 00 per day	564 00	....	564 00
E. B. Hollenbeck	Axeman and office assistant	2 00 per day	308 00	....	308 00
John P. Hughes	Axeman and office assistant	2 00 per day	502 00	....	502 00
F. O. Johnson	Axeman and office assistant	2 00 per day	486 00	....	486 00
R. L. Kelly	Axeman and office assistant	2 00 per day	112 00	....	112 00
A. A. Laughlin	Axeman and office assistant	2 00 per day	344 00	....	344 00
Julius Mishkin	Axeman and office assistant	2 00 per day	268 00	....	268 00
William Mangan	Axeman and office assistant	2 00 per day	624 00	....	624 00
Nelson Mory	Axeman and office assistant	2 00 per day	34 00	....	34 00
E. C. Neudecker	Axeman and office assistant	2 00 per day	74 00	....	74 00
D. I. O'Leary	Axeman and office assistant	2 00 per day	322 00	....	322 00
E. S. Palmer	Axeman and office assistant	2 00 per day	270 00	....	270 00
F. T. Sheldon	Axeman and office assistant	2 00 per day	282 00	....	282 00
L. E. Thompson	Axeman and office assistant	2 00 per day	326 00	....	326 00
H. J. Waldvogel	Axeman and office assistant	2 00 per day	574 00	....	574 00
I. B. Walker	Axeman and office assistant	2 00 per day	210 00	....	210 00
H. J. Weir	Axeman and office assistant	2 00 per day	324 00	....	324 00
Ralph Adams	Laborer	2 00 per day	120 00	....	120 00
F. A. Boltwood	Laborer	2 00 per day	586 00	....	586 00
Howard Bonesteel	Laborer	2 00 per day	50 00	....	50 00
Thomas B. Bowes	Laborer	2 00 per day	368 00	....	368 00
Thomas Brennen	Laborer	2 00 per day	102 00	....	102 00
Cornelius Burns	Laborer	2 00 per day	2 00	....	2 00
James Coffey	Laborer	2 00 per day	146 00	....	146 00
J. E. Collins	Laborer	2 00 per day	222 00	....	222 00
Martin Conroy	Laborer	2 00 per day	128 00	....	128 00
J. L. Curtin	Laborer	2 00 per day	82 00	....	82 00
Gaston de Bellefroid	Laborer	2 00 per day	24 00	....	24 00
William P. Deevey	Laborer	2 00 per day	32 00	....	32 00
F. E. Driscoll	Laborer	2 00 per day	34 00	....	34 00
H. C. Duryee	Laborer	2 00 per day	86 00	....	86 00
Henry Eysaman	Laborer	2 00 per day	54 00	....	54 00
H. A. Falconer	Laborer	2 00 per day	130 00	....	130 00
Charles Fogarty	Laborer	2 00 per day	106 00	....	106 00
William Fogarty	Laborer	2 00 per day	134 00	....	134 00
Joseph P. Fox	Laborer	2 00 per day	650 00	$134 00	784 00
T. E. Gaynor	Laborer	2 00 per day	62 00	....	82 00
T. H. Glavin	Laborer	2 00 per day	50 00	....	50 00
Morris Goldschmidt	Laborer	2 00 per day	198 00	....	198 00
Howard Graham	Laborer	2 00 per day	550 00	....	550 00
Wm. M. Griffith	Laborer	2 00 per day	142 00	....	142 00
Owen Haggerty	Laborer	2 00 per day	620 00	....	620 00
Michael Hart	Laborer	2 00 per day	150 00	....	150 00
E. G. Hollenbeck	Laborer	2 00 per day	150 00	....	150 00
Thos. A. Keane	Laborer	2 00 per day	638 00	....	638 00
John Lavery	Laborer	2 00 per day	726 00	....	726 00
Thos. Lilly	Laborer	2 00 per day	220 00	....	220 00
John Loughlin	Laborer	2 00 per day	582 00	....	582 00
Thos. Madden	Laborer	2 00 per day	442 00	....	442 00
Michael Mahoney	Laborer	2 00 per day	110 00	....	110 00
P. J. McGowan	Laborer	2 00 per day	86 00	....	86 00
F. A. McManus	Laborer	2 00 per day	130 00	....	130 00
David Morris	Laborer	2 00 per day	178 00	....	178 00
W. J. Ryan	Laborer	2 00 per day	56 00	....	56 00
John Seaman	Laborer	2 00 per day	136 00	....	136 00
Jas. Shaughnessy	Laborer	2 00 per day	644 00	....	644 00
Jas. Sherry, Jr	Laborer	2 00 per day	128 00	....	128 00
C. Thomas	Laborer	2 00 per day	68 00	....	68 00
E. W. Thomas	Laborer	2 00 per day	192 00	....	192 00
Oliver Thomas	Laborer	2 00 per day	118 00	....	118 00
Benj. Tumporisky	Laborer	2 00 per day	106 00	....	106 00
Fred Tyre	Laborer	2 00 per day	222 00	....	222 00
Wm. Vollborn	Laborer	2 00 per day	120 00	....	120 00
Ward Walrath	Laborer	2 00 per day	54 00	....	54 00
B. S. Weaver	Laborer	2 00 per day	244 00	....	244 00
M. F. Wemple	Laborer	2 00 per day	626 00	....	626 00
Robt. Wemple	Laborer	2 00 per day	30 00	....	30 00
Chas. J. Wood	Laborer	2 00 per day	128 00	....	128 00

Construction of Barge Canal — Erie Canal — (Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Samuel Ash	Boatman	$3 00 per day	$936 00		$936 00
Jas. Clark	Boatman	3 00 per day	129 00		129 00
Jas. H. Dolan	Boatman	3 00 per day	990 00		990 00
John J. Farrell	Boatman	3 00 per day	933 00		933 00
Wm. Furman	Boatman	3 00 per day	99 00		99 00
Jos. L. Harburger	Boatman	3 00 per day	447 00		447 00
Alfred Hitchcock	Boatman	3 00 per day	333 00		333 00
Edward A. Howard	Boatman	3 00 per day	648 00		618 00
Valentine Massaret	Boatman	3 00 per day	396 00		396 00
Thos. F. McDermott	Boatman	3 00 per day	624 00		624 00
Wm. McGinty	Boatman	3 00 per day	624 00		624 00
Henry A. Mehrtens	Boatman	3 00 per day	549 00		549 00
M. E. Mullaney	Boatman	3 00 per day	402 00		402 00
V. A. Schutz	Boatman	3 00 per day	63 00		63 00
Jas. Sweeney	Boatman	3 00 per day	555 00		555 00
W. L. Van Epps	Boatman	3 00 per day	336 00		336 00
Geo. W. Waters	Boatman	3 00 per day	993 00		993 00
M. J. Waters	Boatman	3 00 per day	237 00		237 00
W. H. Stoneburg	Foreman of borings	3 50 per day	143 50		143 50
Godfrey Aman	Gage reader	7 00 per month	80 00		80 00
C. V. Barrett	Gage reader	5 00 per month	60 00		60 00
William Butler	Gage reader	7 00 per month	56 00		56 00
A. D. Coshun	Gage reader	7 00 per month	84 00		84 00
Henry Edick, Jr	Gage reader	7 00 per month	84 00		84 00
John Fernald	Gage reader	5 00 per month	60 00		60 00
Harrison Fitch	Gage reader	5 00 per month	14 68		14 68
J. J. Gilbert	Gage reader	3 00 per month	36 00		36 00
Herbert Heckle	Gage reader	7 00 per month	84 00		84 00
E. L. Hoffman	Gage reader	7 00 per month	56 00		56 00
Lloyd Kast	Gage reader	5 00 per month	65 00		65 00
Clark Kyser	Gage reader	7 00 per month	35 00		35 00
John B. Mackey	Gage reader	7 00 per month	56 00		56 00
John B. Mahoney	Gage reader	7 00 per month	14 00		14 00
R. S. Marshall	Gage reader	5 00 per month	30 00		30 00
S. H. Pearson	Gage reader	7 00 per month	7 00		7 00
P. C. Pickard	Gage reader	7 00 per month	56 00		56 00
William Quackenbush	Gage reader	7 00 per month	14 00		14 00
J. Reepmeyer, Jr	Gage reader	7 00 per month	84 00		84 00
Addison M. Spencer	Gage reader	7 00 per month	49 00		49 00
John Stark	Gage reader	7 00 per month	70 00		70 00
Edward A. Vrooman	Gage reader	7 00 per month	35 00		35 00
J. J. Vrooman	Gage reader	7 00 per month	21 00		21 00
Minnie E. Wheeler	Gage reader	7 00 per month	84 00		84 00
Robert Wilson	Gage reader	7 00 per month	72 00		72 00
Charles J. Wood	Gage reader	7 00 per month	24 50		24 50
W. E. Young	Gage reader	7 00 per month	42 00		42 00
C. W. Young	Gage reader	14 00 per month	140 00		140 00
			$123,509 24	$5,944 30	$129,453 54
Incidental Expenses.					
Instruments, tools and appliances				$990 40	
Office rent				974 46	
Fuel and light				312 73	
Stationery and printing				256 28	
Postage				165 69	
Telephone and telegraph				684 17	
Miscellaneous				5,230 00	
					8,613 73
Total					$138,067 27

Construction of Barge Canal — Champlain Canal.

Chapter 147, Laws 1903; Chapter 143, Laws 1905; Chapter 172, Laws 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. B. Harrison	Division engineer	$3,600 per year	$400 00	....	$400 00
James Burden	Resident engineer	2,400 per year	1,600 00	$77 43	1,677 43
Fred C. Davis	Resident engineer	2,400 per year	2,200 00	527 06	2,727 06
L. C. Hulburd	Resident engineer	2,400 per year	989 00	103 84	1,092 84
E. V. R. Payne	Resident engineer	2,400 per year	2,400 00	274 11	2,674 11
Parkes D. Wendell	Estimate clerk	150 per month	325 00	30 88	355 88
Charles Stark	Financial clerk	5 00 per day	125 00	....	125 00
Chas. B. Dunham, Jr.	Clerk	100 per month	788 71	20 46	809 17
L. H. Hurd	Clerk	75 00 per month	75 00	....	75 00
Georgina Pflaum	Stenographer	75 00 per month	675 00	....	675 00
J. E. Phinney	Stenographer	75 00 per month	900 00	....	900 00
A. Russell	Temporary stenographer	2 00 per day	28 00	....	28 00
F. B. Holmes	Engineering draftsman	5 00 per day	1,428 00	....	1,428 00
W. J. Weigmann	Engineering draftsman	5 00 per day	245 00	43 26	288 26
Jas. A. Galvin	Engineering draftsman	4 50 per day	934 50	....	934 50
D. E. Damon	Engineering dratfsman	4 00 per day	1,312 00	....	1,312 00
Jas. B. Egbert	Engineering draftsman	4 00 per day	304 00	....	304 00
John E. Hall	Engineering draftsman	4 00 per day	921 22	....	921 22
J. P. Hurley	Engineering draftsman	4 00 per day	200 00	....	200 00
Leon C. Fuller	Tracer	50 00 per month	475 81	....	475 81
C. G. Lamphere	Tracer	50 00 per month	100 00	....	100 00
R. W. Scott	Tracer	50 00 per month	591 13	....	591 13
I. L. Stalker	Tracer	50 00 per month	591 13	....	591 13
S. W. Belding	Assistant engineer	6 00 per day	1,854 00	386 17	2,240 17
H. W. Benedict	Assistant engineer	6 00 per day	1,749 00	11 45	1,760 45
D. F. Fulton	Assistant engineer	6 00 per day	846 00	216 94	1,062 94
D. B. La Du	Assistant engineer	6 00 per day	2,076 00	1,672 85	3,748 85
A. C. Richards	Assistant engineer	6 00 per day	1,738 00	76 36	1,814 36
Harry Shoemaker	Assistant engineer	6 00 per day	1,956 00	807 85	2,763 85
Herbert Spencer	Assistant engineer	6 00 per day	180 00	79 53	259 53
W. B. Watson	Assistant engineer	6 00 per day	2,028 00	....	2,028 00
C. A. Curtis	Assistant engineer	5 00 per day	1,665 50	154 72	1,820 22
James K. Browne	Assistant engineer	5 00 per day	35 00	....	35 00
B. I. Hall	Assistant engineer	5 00 per day	410 00	....	410 00
LeGrand Sterling	Assistant engineer	5 00 per day	775 50	....	775 50
James B. Foote	Leveler	5 00 per day	1,645 00	....	1,645 00
John McBride	Leveler	5 00 per day	1,052 50	....	1,052 50
Raymond Sickles	Leveler	5 00 per day	150 00	....	150 00
W. C. Benedict	Leveler	4 50 per day	1,530 00	....	1,530 00
Earl B. Fox	Leveler	4 50 per day	256 50	....	256 50
R. G. Gibson	Leveler	4 50 per day	1,480 50	....	1,480 50
R. F. Hall	Leveler	4 50 per day	22 50	....	22 50
H. L. Clarke	Rodman	4 00 per day	1,070 00	....	1,070 00
R. E. Demming	Rodman	4 00 per day	1,029 50	....	1,029 50
J. S. Greenough	Rodman	4 00 per day	52 00	....	52 00
L. A. Meron	Rodman	4 00 per day	949 00	....	949 00
H. J. Richardson	Rodman	4 00 per day	212 00	167 27	379 27
Frank Roberts	Rodman	4 00 per day	44 00	....	44 00
R. N. Barrett	Rodman	3 50 per day	182 00	....	182 00
J. B. Doughty	Rodman	3 50 per day	521 50	....	521 50
Geo. Fuller	Rodman	3 50 per day	192 50	....	192 50
W. H. Hillborn	Rodman	3 50 per day	255 50	....	255 50
E. H. Hussey	Rodman	3 50 per day	574 00	....	574 00
B. T. Kenyon	Rodman	3 50 per day	570 50	....	570 50
A. R. Morse	Rodman	3 50 per day	406 00	....	406 00
A. R. Patchke	Rodman	3 50 per day	108 50	....	108 50
G. M. Phelps	Rodman	3 50 per day	63 50	....	63 50
J. B. Rothberg	Rodman	3 50 per day	395 50	....	395 50
E. W. Wendell	Rodman	3 50 per day	525 00	....	525 00
A. E. Wood	Chainman	3 00 per day	600 00	....	600 00
F. C. Armstrong	Chainman	2 50 per day	175 00	....	175 00
Burt H. Boorn	Chainman	2 50 per day	380 00	....	380 00
H. F. Egan	Chainman	2 50 per day	238 00	....	238 00
L. Y. Meneely	Chainman	2 50 per day	255 00	....	255 00
J. L. Walton	Chainman	2 50 per day	92 50	....	92 50
F. B. Watkins	Chainman	2 50 per day	260 00	....	260 00
M. W. Woghlemuth	Chainman	2 50 per day	92 50	....	92 50
A. M. Wait	Inspector of public works	5 00 per day	1,745 00	....	1,745 00
E. V. Allendorph	Inspector of masonry	5 00 per day	676 00	5 05	681 05
W. W. Barclay	Inspector of masonry	4 00 per day	520 00	....	520 00
R. E. Bierce	Inspector of masonry	4 00 per day	92 00	....	92 00

Construction of Barge Canal — Champlain Canal — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. W. Donnelly	Inspector of masonry	$4 00 per day	$648 00	....	$648 00
F. B. Kraft	Inspector of masonry	4 00 per day	1,026 00	....	1,026 00
C. M. Leet	Inspector of masonry	4 00 per day	1,196 00	....	1,196 00
F. G. Tilton	Inspector of masonry	4 00 per day	661 00	....	661 00
W. H. Breen	Inspector of highways	4 00 per day	229 50	....	229 50
Luke Van Valkenburgh	Inspector of highways	3 50 per day	996 50	....	996 50
Julius Bohrer	Axeman and office assistant	2 00 per day	46 00	....	46 00
W. H. Clapp	Axeman and office assistant	2 00 per day	636 00	....	636 00
W. R. Davis	Axeman and office assistant	2 00 per day	54 00	....	54 00
F. B. Hall	Axeman and office assistant	2 00 per day	648 00	....	648 00
W. S. Hood	Axeman and office assistant	2 00 per day	64 00	....	64 00
Wm. Maloney	Axeman and office assistant	2 00 per day	680 00	....	680 00
Nelson Morey	Axeman and office assistant	2 00 per day	380 00	....	380 00
J. J. Raup	Axeman and office assistant	2 00 per day	690 00	....	690 00
Thos Ryan, Jr	Axeman and office assistant	2 00 per day	580 00	....	580 00
F. R. Schneller	Axeman and office assistant	2 00 per day	116 00	....	116 00
John T. Smith	Axeman and office assistant	2 00 per day	244 00	....	244 00
J. A. Barrett	Laborer	2 00 per day	164 00	....	164 00
Cornelius Burns	Laborer	2 00 per day	70 00	....	70 00
J. P. Ca ty	Laborer	2 00 per day	198 00	....	198 00
J. H. Conniff	Laborer	2 00 per day	652 00	....	652 00
Chas. Davis	Laborer	2 00 per day	60 00	....	60 00
Gaston DePellefroid	Laborer	2 00 per day	68 00	....	68 00
W. P. Deevey	Laborer	2 00 per day	60 00	....	60 00
Wm. Dunn	Laborer	2 00 per day	170 00	....	170 00
J. J. Glynn	Laborer	2 00 per day	44 00	$19 68	63 68
L. L. Gowdy	Laborer	2 00 per day	32 00	....	32 00
Jeremiah Hayes	Laborer	2 00 per day	64 00	....	64 00
F. A. Holren	Laborer	2 00 per day	170 00	....	170 00
Jas. Holton	Laborer	2 00 per day	116 00	....	116 00
E. P. Low	Laborer	2 00 per day	116 00	....	116 00
John McMahon	Laborer	2 00 per day	108 00	3 86	111 86
Daniel F. Moore	Laborer	2 00 per day	78 00	....	78 00
Thomas E. Mullen	Laborer	2 00 per day	100 00	....	100 00
H. S. Pattee	Laborer	2 00 per day	338 00	....	338 00
Antonie Roule	Laborer	2 00 per day	46 00	....	46 00
Edward Shanahan	Laborer	2 00 per day	666 00	....	666 00
Ignatius Toole	Laborer	2 00 per day	92 00	....	92 00
Chase Young	Laborer	2 00 per day	64 00	....	64 00
Samuel Ash	Boatman	3 00 per day	81 00	....	81 00
Wm. Furman	Boatman	3 00 per day	78 00	....	78 00
E. A. Howard	Boatman	3 00 per day	237 00	....	237 00
Valentine Massaret	Boatman	3 00 per day	546 00	....	546 00
T. F. McDermott	Boatman	3 00 per day	393 00	....	393 00
Wm. McGinty	Boatman	3 00 per day	393 00	....	393 00
H. A. Mehrteas	Boatman	3 00 per day	468 00	....	468 00
Geo. Morgan	Boatman	3 00 per day	162 00	1 68	163 68
V. A. Schutz	Boatman	3 00 per day	282 00	6 86	288 86
Jos. Sweeney	Boatman	3 00 per day	309 00	....	309 00
M. J. Waters	Boatman	3 00 per day	705 00	....	705 00
Chas. R. Judson	Foreman of borings	3 50 per day	525 00	....	525 00
E. H. Barker	Gage reader	7 00 per month	6 10	....	6 10
Leon C. Brazier	Gage reader	12 00 per month	144 00	....	144 00
Geo. W. Baldwin	Gage reader	7 00 per month	49 00	....	49 00
E. H. Bowker	Gage reader	7 00 per month	21 00	....	21 00
Fred C. Bristol	Gage reader	7 00 per month	42 00	....	42 00
F. E. Chapman	Gage reader	7 00 per month	60 00	....	60 00
S. L. Cluett	Gage reader	7 00 per month	56 00	....	56 00
Hannibal Corkland	Gage reader	7 00 per month	16 33	....	16 33
W. J. Curtis	Gage reader	7 00 per month	84 00	....	84 00
J. H. Donnelly	Gage reader	7 00 per month	42 00	....	42 00
W. E. Downing	Gage reader	7 00 per month	84 00	....	84 00
W. B. Dunstan	Gage reader	7 00 per month	84 00	....	84 00
A. B. Fisher	Gage reader	7 00 per month	25 67	....	25 67
Geo. Hammond	Gage reader	7 00 per month	84 00	....	84 00
A. W. Hollister	Gage reader	7 00 per month	42 00	....	42 00
W. D. LaBar	Gage reader	7 00 per month	84 00	....	84 00
R. S. Metcalf	Gage reader	7 00 per month	84 00	....	84 00
S. H. Pearson	Gage reader	7 00 per month	77 00	....	77 00
Thos. B. Sanders	Gage reader	7 00 per month	84 00	....	84 00
Frank Sisson	Gage reader	7 00 per month	14 00	....	14 00

Construction of Barge Canal — Champlain Canal —(Concl'd).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
A. W. Spencer	Gage reader	$7 00 per month	$7 00	....	$7 00
B. F. Thebo	Gage reader	7 00 per month	84 00	....	84 00
H. C. Tinker	Gage reader	7 00 per month	84 00	....	84 00
Lola Wortz	Gage reader	5 00 per month	25 00	....	25 00
			$69,268 60	$4,687 31	$73,955 91
Incidental Expenses.					
Instruments, tools and appliances				$352 05	
Office rent				659 50	
Fuel and light				237 56	
Stationery and printing				169 91	
Postage				129 35	
Telephone and telegraph				378 15	
Miscellaneous				2,854 43	
					4,780 98
Total					$78,736 89

Improvement of Public Highways.

Chapter 115, Laws 1898, and amendatory laws

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. B. Harrison	Division engineer	$3,600 per year	....	$1,211 21	$1,211 21
Dana W. Robbins	Resident engineer	2,700 per year	$1,575 00	86 62	1,661 62
H. W. DeGraff	Resident engineer	2,400 per year	46 66	7 08	53 74
O. J. Dempster	Resident engineer	2,400 per year	40 00	8 30	48 30
Perry Filkin	Resident engineer	2,400 per year	2,362 00	997 05	3,359 05
R. S. Greenman	Resident engineer	2,400 per year	190 00	191 68	381 68
C. H. Hoyt	Resident engineer	2,400 per year	1,668 66	598 75	2,267 41
J. R. Kaley	Resident engineer	2,400 per year	2,400 00	443 58	2,843 58
E. A. Lamb	Resident engineer	2,400 per year	2,400 00	577 74	2,977 74
J. A. O'Connor	Resident engineer	2,400 per year	2,020 00	612 65	2,632 65
O. C. Richards	Resident engineer	2,400 per year	2,362 00	240 73	2,602 73
F. N. Sanders	Resident engineer	2,400 per year	2,374 00	966 67	3,340 67
H. Spencer	Resident engineer	2,400 per year	1,600 00	459 13	2,059 13
H. P. Willis	Resident engineer	2,400 per year	1,677 42	97 35	1,774 77
H. K. Bishop	Hydraulic macadam expert	10 00 per day	3,140 00	711 23	3,851 23
C. H. O'Neill	Confidential assistant	333 33 per mo.	3,166 64	153 23	3,319 87
Lu'e A. Keenan	Financial clerk and auditor	233 33 per mo.	1,623 31	327 25	1,950 56
Chas. Stark	Financial clerk and auditor	5 00 per day	260 00	....	260 00
P. D. Wendell	Estimate clerk	150 00 per mo.	980 00	158 19	1,138 19
W. B. Strong	Estimate clerk	133 33 per mo.	1,594 97	3 98	1,598 95
J. E. Kirk	Clerk	125 00 per mo.	125 00	....	125 00
J. M. Smelzer	Clerk	100 00 per mo.	1,116 65	....	1,116 65
George T. Waterman	Clerk	80 00 per mo.	573 79	....	573 79
L. H. Hurd	Clerk	75 00 per mo.	112 50	....	112 50
Mariana Brothers	Clerk	60 00 per mo.	660 00	....	660 00
J. J. Allen	Canal clerk	....	....	135 02	135 02
R. L. Fredendall	Stenographer	125 00 per mo.	525 00	....	525 00
Matie Kelly	Stenographer	100 00 per mo.	1,200 00	....	1,200 00
Mabel Weinholz	Stenographer	100 00 per mo.	1,066 64	....	1,066 64
Elizabeth A. Crowl	Stenographer	83 33 per mo.	749 97	....	749 97
Harriet L. Davis	Stenographer	83 33 per mo.	699 99	....	699 99
Hattie A. Dell	Stenographer	75 00 per mo.	700 81	....	700 81
Margaret J. Buckley	Stenographer	60 00 per mo.	276 67	....	276 67
S. C. MacNeil	Stenographer	60 00 per mo.	267 09	....	267 09
James S. Clair	Stenographer	50 00 per mo.	266 67	....	266 67
Clara E. Bailey	Temporary stenographer	76 00 per mo.	196 13	....	196 13
Bridgie T. Kelley	Temporary stenographer	50 00 per mo.	11 29	....	11 29
Charles R. Judson	Foreman of borings	3 50 per day	434 00	8 43	442 43
Guy H. Miller	First assistant engineer	7 00 per day	721 00	....	721 00
C. R. Allen, Jr.	Assistant engineer	6 00 per day	2,076 00	250 26	2,326 26

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
E. F. Ayres	Assistant engineer	$6 00 per day	$1,902 00	$12 11	$1,914 11
F. A. Biggi	Assistant engineer	6 00 per day	951 00	151 03	1,102 03
H. E. Breed	Assistant engineer	6 00 per day	1,884 00	363 40	2,247 40
A. G. Chapman	Assistant engineer	6 00 per day	1,384 00	278 21	1,662 21
J. L. Chapman	Assistant engineer	6 00 per day	186 00	....	186 00
J. C. Davis	Assistant engineer	6 00 per day	1,722 00	56 87	1,778 87
George A. Ensign	Assistant engineer	6 00 per day	1,740 00	133 15	1,873 15
J. C. Finch	Assistant engineer	6 00 per day	2,010 00	104 08	2,114 08
C. T. Fisher	Assistant engineer	6 00 per day	1,890 00	389 26	2,279 26
R. J. Harding	Assistant engineer	6 00 per day	60 00	....	60 00
R. D. Hayes	Assistant engineer	6 00 per day	1,898 00	836 09	2,734 09
R. Hopkins	Assistant engineer	6 00 per day	1,376 00	48 31	1,424 31
L. T. Howard	Assistant engineer	6 00 per day	1,884 00	259 93	2,143 93
E. J. Howe	Assistant engineer	6 00 per day	1,727 00	137 62	1,864 62
H. C. Kline	Assistant engineer	6 00 per day	1,098 00	29 57	1,127 57
H. J. Langlois	Assistant engineer	6 00 per day	2,079 00	717 86	2,796 86
K. Lindsay	Assistant engineer	6 00 per day	1,032 00	87 42	1,119 42
F. B. Morss	Assistant engineer	6 00 per day	1,878 00	250 16	2,128 16
F. J. Mulvaney	Assistant engineer	6 00 per day	1,920 00	169 28	2,089 28
R. J. Murray	Assistant engineer	6 00 per day	1,884 00	318 91	2,202 91
G. H. Penfield	Assistant engineer	6 00 per day	936 00	135 31	1,071 31
P. W. O'Grady	Assistant engineer	6 00 per day	48 00	36 96	84 96
E. G. Raynor	Assistant engineer	6 00 per day	1,866 00	38 01	1,904 01
A. L. Simmons	Assistant engineer	6 00 per day	1,830 00	8 98	1,838 98
J. H. Sturdevant	Assistant engineer	6 00 per day	1,752 00	943 87	2,695 87
E. W. Sylvester	Assistant engineer	6 00 per day	1,428 00	299 13	1,727 13
N. A. Taylor	Assistant engineer	6 00 per day	2,004 00	336 33	2,340 33
G. G. Underhill	Assistant engineer	6 00 per day	186 00	9 73	195 76
J. B. Wright	Assistant engineer	6 00 per day	1,890 00	363 12	2,253 12
M. J. Adams	Assistant engineer	5 00 per day	1,467 00	21 96	1,488 96
L. G. Bayly	Assistant engineer	5 00 per day	1,458 50	120 49	1,578 99
J. C. Bell	Assistant engineer	5 00 per day	495 00	975 37	1,470 37
H. E. Blake	Assistant engineer	5 00 per day	1,570 00	207 33	1,777 33
G. M. Briggs	Assistant engineer	5 00 per day	915 00	2 97	917 97
F. H. Brundage	Assistant engineer	5 00 per day	950 00	54 56	1,004 56
O. L. Burdette	Assistant engineer	5 00 per day	350 00	....	350 00
L. R. W. Clark	Assistant engineer	5 00 per day	725 00	7 77	732 77
J. D. Colby	Assistant engineer	5 00 per day	720 00	22 76	742 76
W. G. Craig	Assistant engineer	5 00 per day	1,555 00	56 14	1,611 14
J. H. Crewell	Assistant engineer	5 00 per day	315 00	21 56	336 56
F. S. Crowell	Assistant engineer	5 00 per day	915 00	101 92	1,016 92
W. F. Farley	Assistant engineer	5 00 per day	760 00	75 20	835 20
P. L. Hass	Assistant engineer	5 00 per day	655 00	69 87	724 87
G. R. Halpin	Assistant engineer	5 00 per day	1,615 00	278 37	1,893 37
C. L. Henderson	Assistant engineer	5 00 per day	760 00	16 43	776 43
E. E. Kendall	Assistant engineer	5 00 per day	440 00	34 00	474 00
F. W. McKinney	Assistant engineer	5 00 per day	455 00	48 41	503 41
N. C. McNeil	Assistant engineer	5 00 per day	395 00	77 88	472 88
A. S. Mirick	Assistant engineer	5 00 per day	795 00	13 95	808 95
L. H. Parker	Assistant engineer	5 00 per day	1,005 00	94 58	1,099 58
C. I. Peckham	Assistant engineer	5 00 per day	895 00	282 43	1,177 43
A. C. Perkins	Assistant engineer	5 00 per day	40 00	....	40 00
C. P. Pengnet	Assistant engineer	5 00 per day	755 00	61 06	816 06
D. C. Roberts	Assistant engineer	5 00 per day	1,520 00	34 38	1,554 38
G. C. See	Assistant engineer	5 00 per day	800 00	16 10	816 10
F. J. Schoenlaub	Assistant engineer	5 00 per day	1,580 00	15 81	1,595 81
Edw. Taylor	Assistant engineer	5 00 per day	1,580 00	132 19	1,712 19
D. J. Tonkonogy	Assistant engineer	5 00 per day	1,295 00	35 48	1,331 48
M. W. Wolff	Assistant engineer	5 00 per day	1,545 00	111 30	1,656 30
F. C. Woodward	Assistant engineer	5 00 per day	1,500 00	228 02	1,728 02
J. L. Bogart, Jr.	Provisional assistant engineer	5 00 per day	315 00	17 88	332 88
Leo Freitag	Provisional assistant engineer	5 00 per day	385 00	59 16	444 16
H. F. Hills	Provisional assistant engineer	5 00 per day	235 00	36 40	271 40
F. J. Lempe	Provisional assistant engineer	5 00 per day	190 00	10 52	200 52
G. H. Matthews	Provisional assistant engineer	5 00 per day	775 00	....	775 00
F. W. Mills	Provisional assistant engineer	5 00 per day	543 00	29 25	572 25
A. H. Olmstead	Provisional assistant engineer	5 00 per day	410 00	275 46	685 46
G. F. Quest	Provisional assistant engineer	5 00 per day	325 00	10 42	335 42
E. D. Walsh	Provisional assistant engineer	5 00 per day	335 00	77 17	412 17
L. S. Wood	Provisional assistant engineer	5 00 per day	315 00	9 25	324 25
W. A. Zeiser	Provisional assistant engineer	5 00 per day	330 00	58 49	388 49
J. K. Brown	Leveler	5 00 per day	1,418 00	18 45	1,436 45
C. W. Diefendorf	Leveler	5 00 per day	1,500 00	243 07	1,743 07

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Gordon Edson	Leveler	$5 00 per day	$1,545 00	$222 72	$1,767 72
T. A. Hendrickson	Leveler	5 00 per day	1,305 00	....	1,205 00
W. T. Hunt	Leveler	5 00 per day	1,480 00	229 74	1,709 74
L. L. Melius	Leveler	5 00 per day	580 00	113 09	693 09
John McBride	Leveler	5 00 per day	435 00	....	435 00
Ralph Russell	Leveler	5 00 per day	80 00	....	80 00
Raymond Sickles	Leveler	5 00 per day	1,366 00	116 73	1,482 73
A. W. Smith	Leveler	5 00 per day	1,440 00	229 21	1,669 21
S. R. Tighe	Leveler	5 00 per day	1,048 00	3 90	1,051 90
C. C. Ahles	Leveler	4 50 per day	1,219 50	191 34	1,410 84
M. J. Bartley	Leveler	4 50 per day	985 50	....	985 50
F. L. Bisbee	Leveler	4 50 per day	1,408 50	188 93	1,597 43
E. R. Bitler	Leveler	4 50 per day	670 50	....	670 50
J. W. Calder	Leveler	4 50 per day	118 00	....	118 00
R. A. Caughey	Leveler	4 50 per day	391 50	....	391 50
C. R. DeGraff	Leveler	4 50 per day	1,413 00	122 66	1,535 66
Charles Donahue	Leveler	4 50 per day	229 50	....	229 50
J. J. Doyle	Leveler	4 50 per day	715 50	5 12	720 62
H. C. Ellis	Leveler	4 50 per day	1,422 00	40 20	1,462 20
O. L. Eltinge	Leveler	4 50 per day	681 50	....	681 50
J. A. Farquhar	Leveler	4 50 per day	823 50	41 32	864 82
George A. Flynn	Leveler	4 50 per day	1,377 00	134 31	1,511 31
E. B. Fox	Leveler	4 50 per day	68 50	....	68 50
S. W. Gage	Leveler	4 50 per day	837 00	109 71	946 71
J. C. Gotwals	Leveler	4 50 per day	1,467 00	317 48	1,784 48
C. E. Gruner	Leveler	4 50 per day	684 00	15 12	699 12
H. A. Haight	Leveler	4 50 per day	418 00	35 07	453 07
J. J. Huber	Leveler	4 50 per day	1,408 50	21 43	1,429 93
Grant Huntley	Leveler	4 50 per day	157 50	1 84	159 34
A. J. Kaufman	Leveler	4 50 per day	1,399 50	191 15	1,590 65
LeRoy J. McCarty	Leveler	4 50 per day	1,417 50	62 85	1,480 35
Harry Nathan	Leveler	4 50 per day	693 00	49 38	742 38
Charles Osborne	Leveler	4 50 per day	391 50	7 43	398 93
C. H. Pearce	Leveler	4 50 per day	40 50	....	40 50
Van R. Phillips	Leveler	4 50 per day	27 00	....	27 00
J. A. Small	Leveler	4 50 per day	666 00	1 87	667 87
W. J. P. Simpson	Leveler	4 50 per day	499 50	6 48	505 98
C. H. Stillman	Leveler	4 50 per day	661 50	24 60	686 10
P. L. Speir	Leveler	4 50 per day	391 50	45 08	436 58
D. D. Thompson	Leveler	4 50 per day	1,187 50	87 33	1,274 83
W. R. Turnbull	Leveler	4 50 per day	1,404 00	34 39	1,438 39
Lee Walker	Leveler	4 50 per day	1,236 50	35 82	1,272 32
W. E. Weller	Leveler	4 50 per day	661 50	254 34	915 84
Louis Wachtel	Leveler	4 50 per day	683 50	292 73	976 23
F. A. Bedell	Highway inspector	4 50 per day	1,404 00	23 00	1,427 00
H. R. Bedell	Highway inspector	4 50 per day	1,408 50	22 99	1,431 49
S. J. Bennett	Highway inspector	4 50 per day	1,584 00	391 73	1,975 73
M. S. Bierce	Highway inspector	4 50 per day	316 00	....	316 00
G. L. Blauvelt	Highway inspector	4 50 per day	1,251 00	286 62	1,537 62
Harry Bowen	Highway inspector	4 50 per day	1,179 00	2,446 25	3,625 25
James T. Brady	Highway inspector	4 50 per day	1,647 00	1,074 05	2,721 05
A. B. Culver	Highway inspector	4 50 per day	1,399 50	216 33	1,615 83
R. J. Curtis	Highway inspector	4 50 per day	1,252 50	263 03	1,515 53
Blaine Gilday	Highway inspector	4 50 per day	1,068 00	194 62	1,262 62
L. L. Gowdy	Highway inspector	4 50 per day	990 50	769 64	1,760 14
G. H. Harter	Highway inspector	4 50 per day	1,408 50	363 74	1,772 24
F. W. Hartwell	Highway inspector	4 50 per day	1,426 50	102 32	1,528 82
W. E. L. Hunter	Highway inspector	4 50 per day	972 50	407 71	1,380 21
H. A. Knapp	Highway inspector	4 50 per day	1,386 00	9 30	1,395 30
J. R. Mahan	Highway inspector	4 50 per day	787 50	67 97	855 47
H. S. Mattimore	Highway inspector	4 50 per day	1,268 00	486 45	1,754 45
W. S. McLachlin	Highway inspector	4 50 per day	1,413 00	94 49	1,507 49
W. J. McVay	Highway inspector	4 50 per day	1,098 50	71 46	1,167 96
B. E. Murray	Highway inspector	4 50 per day	1,007 50	43 60	1,051 10
Joseph E. Myers	Highway inspector	4 50 per day	1,132 00	19 23	1,151 23
J. J. O'Hara	Highway inspector	4 50 per day	1,110 00	....	1,110 00
F. H. Owens	Highway inspector	4 50 per day	1,256 00	67 53	1,323 53
J. C. Patrick	Highway inspector	4 50 per day	1,404 00	1,018 23	2,422 23
W. M. Payne	Highway inspector	4 50 per day	1,417 50	100 41	1,517 91
H. E. Poole	Highway inspector	4 50 per day	1,476 00	244 34	1,720 34
A. W. Rogers	Highway inspector	4 50 per day	720 00	42 08	762 08
J. B. Ryder	Highway inspector	4 50 per day	1,404 00	8 00	1,412 00

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
T. H. Thyer	Highway inspector	$4 50 per day	$688 00	$83 32	$771 32
H. C. Titus	Highway inspector	4 50 per day	1,413 00	226 21	1,639 21
W. E. Waterbury	Highway inspector	4 50 per day	265 50	11 88	277 38
A. E. Weinbolz	Highway inspector	4 50 per day	461 00	73 80	537 80
H. C. Welles	Highway inspector	4 50 per day	1,323 00	68 50	1,391 50
W. G. Edgerton	Highway inspector	4 00 per day	781 00	....	781 00
E. B. Garrison	Highway inspector	4 00 per day	1,177 00	....	1,177 00
R. O. Hollenbeck	Highway inspector	4 00 per day	1,248 00	31 20	1,279 20
H. L. Michael	Highway inspector	4 00 per day	1,197 50	152 77	1,350 27
E. C. Altenburg	Highway inspector	3 50 per day	385 00	6 08	391 08
C. C. Baker	Highway inspector	3 50 per day	952 00	41 78	993 78
G. E. Bates	Highway inspector	3 50 per day	199 50	19 97	219 47
C. D. Boughton	Highway inspector	3 50 per day	1,099 00	23 54	1,122 54
D. J. Brown	Highway inspector	3 50 per day	794 00	26 69	820 69
H. A. Carroll	Highway inspector	3 50 per day	1,148 00	....	1,148 00
C. R. Cornwell	Highway inspector	3 50 per day	1,113 00	667 20	1,780 20
W. D. Covey	Highway inspector	3 50 per day	381 50	5 02	386 52
S. C. Denby	Highway inspector	3 50 per day	876 00	357 22	1,233 22
William Dotie, Jr.	Highway inspector	3 50 per day	388 50	2 14	390 64
Alex. Ganthier	Highway inspector	3 50 per day	24 50	3 85	28 35
W. S. Gray	Highway inspector	3 50 per day	941 50	105 65	1,047 15
H. C. Greene	Highway inspector	3 50 per day	822 50	87 05	909 55
Lowell Grossman	Highway inspector	3 50 per day	1,015 00	151 87	1,166 87
L. A. Guerber	Highway inspector	3 50 per day	553 00	8 83	561 83
J. V. Harrington	Highway inspector	3 50 per day	1,085 00	1 50	1,086 50
W. H. Hayes	Highway inspector	3 50 per day	668 50	4 25	672 75
B. E. Hodges	Highway inspector	3 50 per day	829 50	47 48	876 98
J. W. Holler	Highway inspector	3 50 per day	458 50	4 45	462 95
A. M. Hollister	Highway inspector	3 50 per day	227 50	....	227 50
A. G. Horne	Highway inspector	3 50 per day	721 50	103 27	824 77
G. C. Hoyer	Highway inspector	3 50 per day	532 00	16 68	548 68
E. J. Kirk	Highway inspector	3 50 per day	988 00	14 25	1,002 25
Wm. J. Ludden, Jr	Highway inspector	3 50 per day	38 50	2 50	41 00
George H. Maher	Highway inspector	3 50 per day	406 00	10 51	416 51
William G. Merritt	Highway inspector	3 50 per day	721 00	135 84	856 84
F. W. Mills	Highway inspector	3 50 per day	336 00	....	336 00
Chester Moore	Highway inspector	3 50 per day	178 50	18 84	197 34
W. P. Murray	Highway inspector	3 50 per day	52 50	1 56	54 06
A. A. Pearce	Highway inspector	3 50 per day	801 00	66 69	867 69
H. E. Reeves	Highway inspector	3 50 per day	1,046 00	22 77	1,068 77
John Schuman, Jr	Highway inspector	3 50 per day	458 50	9 27	467 77
G. V. Sherrill	Highway inspector	3 50 per day	336 00	68 66	404 66
J. A. Thompson	Highway inspector	3 50 per day	885 50	2 38	887 88
W. J. Ward	Highway inspector	3 50 per day	994 00	215 92	1,209 92
E. C. Bernard	Provisional highway inspector	3 50 per day	122 50	55 55	178 05
Michael Lang	Provisional highway inspector	3 50 per day	73 50	12 06	85 56
G. M. Steinert	Provisional highway inspector	3 50 per day	136 50	4 42	140 92
C. D. Burrus	Engineering draftsman	6 00 per day	1,242 00	....	1,242 00
C. H. Chilvers	Engineering draftsman	5 00 per day	1,503 00	134 23	1,637 23
W. R. Gorden	Engineering draftsman	5 00 per day	1,305 00	1,162 28	2,467 28
H. W. Lockwood	Engineering draftsman	5 00 per day	920 00	51 93	971 93
M. W. Nelson	Engineering draftsman	5 00 per day	1,6[illegible]5 00	95 63	1,720 63
B. J. Noack	Architectural draftsman	5 00 per day	820 00	....	820 00
J. A. O'Donnell	Engineering draftsman	5 00 per day	1,5[illegible]0 00	14 60	1,544 60
W. E. Petty	Engineering draftsman	5 00 per day	1,6[illegible]0 00	340 18	1,910 18
C. D. Sniggs	Engineering draftsman	5 00 per day	1,463 00	....	1,463 00
R. P. Campfield	Engineering draftsman	4 50 per day	1,143 04	19 10	1,162 14
C. H. Andrus	Engineering draftsman	4 00 per day	448 00	....	448 00
F. F. Bayly	Engineering draftsman	4 00 per day	216 00	....	216 00
G. F. Bolton	Engineering draftsman	4 00 per day	672 00	....	672 00
G. F. Bond, Jr.	Engineering draftsman	4 00 per day	660 00	54 85	714 85
H. S. Brokaw	Engineering draftsman	4 00 per day	311 50	10 61	322 11
H. E. Butcher	Engineering draftsman	4 00 per day	228 00	....	228 00
Alphonse Carrera	Engineering draftsman	4 00 per day	1,192 00	....	1,192 00
W. L. Caler	Engineering draftsman	4 00 per day	652 00	16 01	668 01
A. T. Clark	Engineering draftsman	4 00 per day	44 00	3 96	47 96
H. B. Coleman	Engineering draftsman	4 00 per day	664 00	8 11	672 11
C. F. de Clercq	Engineering draftsman	4 00 per day	108 00	....	108 00
H. Dunbar	Engineering draftsman	4 00 per day	220 00	12 29	232 29
S. B. Easton	Engineering draftsman	4 00 per day	228 00	....	228 00
J. B. Egbert	Engineering draftsman	4 00 per day	688 00	....	688 00
E. G. Getty, Jr.	Engineering draftsman	4 00 per day	1,170 50	29 41	1,199 91

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
E. C. Hackett	Engineering draftsman	$4 00 per day	$1,256 00	$70 89	$1,326 89
F. W. Harris	Engineering draftsman	4 00 per day	232 00		232 00
B. C. Lechler	Engineering draftsman	4 00 per day	196 00		196 00
G. D. Meer	Engineering draftsman	4 00 per day	1,220 00		1,220 00
J. E. Mincher	Engineering draftsman	4 00 per day	220 00		220 00
A. T. Paine	Engineering draftsman	4 00 per day	628 00	2 18	630 18
G. M. Quackenbush	Engineering draftsman	4 00 per day	164 00		164 00
J. D. Rutledge	Engineering draftsman	4 00 per day	1,174 00	115 42	1,289 42
Emanuel Scheyer	Engineering draftsman	4 00 per day	156 00	2 18	158 18
E. J. Sipple	Engineering draftsman	4 00 per day	568 00	9 82	577 82
W. A. Treadwell	Engineering draftsman	4 00 per day	872 00	15 24	887 24
R. H. Warrin	Engineering draftsman	4 00 per day	636 00	4 71	640 71
C. R. Waters	Engineering draftsman	4 00 per day	1,236 00	159 08	1,395 08
W. G. White	Engineering draftsman	4 00 per day	20 00		20 00
H. R. Wickham	Engineering draftsman	4 00 per day	240 00		240 00
R. F. T. Wilke	Engineering draftsman	4 00 per day	1,228 00	373 66	1,601 66
R. L. Angell	Provisional engineering draftsman	4 00 per day	20 00		20 00
W. P. Benjamin	Provisional engineering draftsman	4 00 per day	22 00		22 00
R. E. Demming	Provisional engineering draftsman	4 00 per day	38 00		38 00
S. B. Garit	Provisional engineering draftsman	4 00 per day	23 00		23 00
J. H. Kennedy	Provisional engineering draftsman	4 00 per day	113 50		113 50
C. S. Allen	Tracer	75 00 per month	414 72	142 07	556 79
J. S. Heath	Tracer	75 00 per month	711 28		711 28
S. T. Vosburg	Tracer	75 00 per month	803 23		803 23
J. D. Ettinger	Tracer	50 00 per month	209 02	3 76	212 78
H. P. Condon	Rodman	4 00 per day	1,308 00	33 89	1,341 89
J. E. DeLee	Rodman	4 00 per day	1,250 50	59 00	1,309 50
F. J. Doerhoefer	Rodman	4 00 per day	420 00	2 83	422 83
Warren Gardner	Rodman	4 00 per day	1,198 50	93 97	1,292 47
J. S. Greenough	Rodman	4 00 per day	1,099 50	59 84	1,159 34
F. J. Kinney	Rodman	4 00 per day	1,264 50	547 47	1,811 97
A. J. Muench	Rodman	4 00 per day	1,252 00	60 19	1,312 19
David Noonan	Rodman	4 00 per day	1,167 00	20 10	1,187 10
J. T. O'Horo	Rodman	4 00 per day	1,272 00	599 64	1,871 64
D. P. O'Neil	Rodman	4 00 per day	1,118 50	8 52	1,127 02
F. E. Reed	Rodman	4 00 per day	1,252 00	100 97	1,352 97
H. J. Richardson	Rodman	4 00 per day	140 00	84 41	224 41
R. H. Sammons	Rodman	4 00 per day	1,152 00	124 00	1,276 00
H. T. Tuthill	Rodman	4 00 per day	1,114 00	134 61	1,248 64
J. H. Adolph	Rodman	3 50 per day	420 00	31 74	451 74
D. P. Babcock	Rodman	3 50 per day	126 00	31 02	157 02
M. C. Barker	Rodman	3 50 per day	1,095 50	114 88	1,210 38
R. N. Barrett	Rodman	3 50 per day	934 50	78 19	1,012 69
E. D. Bean	Rodman	3 50 per day	427 00	4 80	431 80
Wm. Beiermeister	Rodman	3 50 per day	182 00	16 12	198 12
Jacques Birkhahn	Rodman	3 50 per day	308 00	16 54	324 54
W. C. Bratton	Rodman	3 50 per day	462 00	236 39	698 39
Pincus Bruner	Rodman	3 50 per day	388 50		388 50
Otto Brown	Rodman	3 50 per day	441 00	15 48	456 48
F. W. Burleigh	Rodman	3 50 per day	122 50		122 50
A. L. Bush	Rodman	3 50 per day	304 50	2 70	307 20
S. Ehrenrich	Rodman	3 50 per day	451 50	68 55	520 05
J. A. Glominski	Rodman	3 50 per day	101 50		101 50
Morris Glassberg	Rodman	3 50 per day	339 50	14 29	353 79
L. H. Johnson	Rodman	3 50 per day	325 50	18 74	344 24
G. H. Jones	Rodman	3 50 per day	17 50		17 50
P. D. Jump	Rodman	3 50 per day	829 50	53 30	882 80
J. N. Keenan	Rodman	3 50 per day	119 00		119 00
A. D. Kline	Rodman	3 50 per day	346 50	7 73	354 23
E. L. Kinney	Rodman	3 50 per day	224 00	12 26	236 26
H. R. Leland	Rodman	3 50 per day	451 50	55 01	506 51
Samuel Levine	Rodman	3 50 per day	388 50		388 50
P. F. Matteson	Rodman	3 50 per day	392 00	3 76	395 76
W. J. Popp	Rodman	3 50 per day	199 50	5 68	205 18
A. E. Roche	Rodman	3 50 per day	472 50	19 67	492 17
J. F. Scanlon	Rodman	3 50 per day	591 50	73 45	664 95
I. H. Segal	Rodman	3 50 per day	413 00		413 00
J. H. Sheridan	Rodman	3 50 per day	353 50	8 55	362 05
G. H. Shulte	Rodman	3 50 per day	304 50	16 39	320 89
H. S. Silvester	Rodman	3 50 per day	420 00	21 92	441 92
A. G. Slatcher	Rodman	3 50 per day	388 50	1 15	389 65
W. S. St. John	Rodman	3 50 per day	17 50	11 38	28 88

Improvement of Public Highways —(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
A. T. Van Horn	Rodman	$3 50 per day	$462 00	$7 54	$469 54
J. E. Walsh	Rodman	3 50 per day	185 50		185 50
H. A. Willis	Rodman	3 50 per day	238 00		238 00
R. D. Wiswall	Rodman	3 50 per day	640 50	102 60	743 10
H. L. Felch	Chainman	3 00 per day	447 00	8 41	455 41
W. D. Hildreth	Chainman	3 00 per day	291 00	3 12	294 12
E. H. Leggett	Chainman	3 00 per day	286 00	138 54	424 54
H. E. Miller	Chainman	3 00 per day	24 00		24 00
G. M. Phelps	Chainman	3 00 per day	108 50		108 50
H. P. Pitcher	Chainman	3 00 per day	206 00		206 00
A. E. Wood	Chainman	3 00 per day	342 00	13 02	355 02
C. F. Bidgood	Chainman	2 50 per day	75 00		75 00
W. V. Bourke	Chainman	2 50 per day	540 00	11 21	551 21
W. M. Bronk	Chainman	2 50 per day	377 50	11 98	389 48
C. E. Burleigh	Chainman	2 50 per day	167 50	8 31	175 81
Samuel Cooner	Chainman	2 50 per day	315 00	247 33	562 33
John Delaney	Chainman	2 50 per day	674 00	71 14	745 14
G. S. Donahue	Chainman	2 50 per day	695 50	72 22	767 72
J. L. Duffy	Chainman	2 50 per day	38 75		38 75
M. D. Dugan	Chainman	2 50 per day	385 00	48 21	433 21
Morris Franklin	Chainman	2 50 per day	257 50	19 37	276 87
G. G. Gallico	Chainman	2 50 per day	167 50	16 67	185 17
W. M. Griffith	Chainman	2 50 per day	382 50	22 75	405 25
Stanley Hargen	Chainman	2 50 per day	352 50	1 20	353 70
Raymond Haverly	Chainman	2 50 per day	182 50	12 76	195 26
Raymond Jerrall	Chainman	2 50 per day	390 00	24 57	414 57
E. K. Kenneston	Chainman	2 50 per day	122 50		122 50
H. J. Kingsley	Chainman	2 50 per day	335 00	42 34	377 34
H. G. Krohn	Chainman	2 50 per day	77 50	13 15	90 65
J. C. Lutkenhaus	Chainman	2 50 per day	487 00	11 52	498 52
F. J. Lynch	Chainman	2 50 per day	207 50	36 09	243 59
Virgil Markle	Chainman	2 50 per day	381 50	2 73	384 23
F. E. Misner	Chainman	2 50 per day	385 00		385 00
H. B. Parker	Chainman	2 50 per day	177 50	96 44	273 94
Morris Perlman	Chainman	2 50 per day	275 00	4 91	279 91
T. McE. Pruyn	Chainman	2 50 per day	597 00	177 36	774 36
L. P. Slade	Chainman	2 50 per day	195 00	2 35	197 35
W. M. Stieve	Chainman	2 50 per day	147 50	12 30	159 80
J. R. Tighe	Chainman	2 50 per day	347 50	12 45	359 95
T. L. Way	Chainman	2 50 per day	152 50		152 50
C. A. Wilbur	Chainman	2 50 per day	202 50	138 42	340 92
M. W. Woghlemuth	Chainman	2 50 per day	285 00	73 90	358 90
H. C. Young	Chainman	2 50 per day	202 50	57 06	259 56
George A. Abbott	Axeman and office assistant	2 00 per day	568 00	104 25	672 25
David S. Akin	Axeman and office assistant	2 00 per day	244 00	71 08	315 08
W. B. Anderson	Axeman and office assistant	2 00 per day	244 00		244 00
S. S. Backus	Axeman and office assistant	2 00 per day	344 00	22 73	366 73
LeRoy Barrer	Axeman and office assistant	2 00 per day	26 00		26 00
Harry A. Bayly	Axeman and office assistant	2 00 per day	298 00	94 50	392 50
E. L. Bennett	Axeman and office assistant	2 00 per day	532 00	122 00	654 00
Samuel Bestimt	Axeman and office assistant	2 00 per day	282 00	8 28	290 28
Robt. Block	Axeman and office assistant	2 00 per day	240 00	14 79	254 79
Kenneth M. Boutelle	Axeman and office assistant	2 00 per day	134 00	49 00	183 00
J. J. Brennan	Axeman and office assistant	2 00 per day	568 00	3 05	571 05
Philip F. Burmaster	Axeman and office assistant	2 00 per day	418 00	36 64	454 64
Raymond H. Bushnell	Axeman and office assistant	2 00 per day	294 00	5 14	299 14
L. M. Butler	Axeman and office assistant	2 00 per day	192 00		192 00
H. R. Caine	Axeman and office assistant	2 00 per day	476 00	4 00	480 00
Henry Cash	Axeman and office assistant	2 00 per day	66 00	8 95	74 95
L. F. Cashman	Axeman and office assistant	2 00 per day	290 00	20 84	310 84
A. A. Carroll	Axeman and office assistant	2 00 per day	316 00		316 00
J. B. Carroll	Axeman and office assistant	2 00 per day	402 00		402 00
A. C. Chainson	Axeman and office assistant	2 00 per day	228 00	5 40	233 40
Seneca J. Cleveland	Axeman and office assistant	2 00 per day	396 00	8 60	404 60
C. O. Conger	Axeman and office assistant	2 00 per day	398 00	7 94	405 94
F. D. W. Connelly	Axeman and office assistant	2 00 per day	628 00	223 53	851 53
George W. Cook, Jr	Axeman and office assistant	2 00 per day	246 00		246 00
Martin Conroy	Axeman and office assistant	2 00 per day	244 00	32 98	276 98
J. J. Craven	Axeman and office assistant	2 00 per day	242 00	53 70	295 70
Roy W. Crawford	Axeman and office assistant	2 00 per day	328 00	7 74	335 74
W. R. Davis	Axeman and office assistant	2 00 per day	424 00	13 90	437 90
W. A. Dawson	Axeman and office assistant	2 00 per day	48 00		48 00
Claude C. Donahue	Axeman and office assistant	2 00 per day	334 00	16 66	350 66

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
George J. Dugan	Axeman and office assistant	$2 00 per day	$622 00	$3 60	$625 60
Geyza Dubrasky	Axeman and office assistant	2 00 per day	252 00	13 51	265 51
D. Dworsak	Axeman and office assistant	2 00 per day	92 00		92 00
Earl M. Elliott	Axeman and office assistant	2 00 per day	80 00		80 00
George F. Eschwei	Axeman and office assistant	2 00 per day	610 00	77 91	687 91
R. E. Faust	Axeman and office assistant	2 00 per day	328 00	17 17	345 17
Charles Fisher	Axeman and office assistant	2 00 per day	280 00	4 94	284 94
Gerald B. Fitzgerald	Axeman and office assistant	2 00 per day	208 00		208 00
Roger Fitzpatrick	Axeman and office assistant	2 00 per day	156 00	7 66	163 66
John G. Flynn	Axeman and office assistant	2 00 per day	332 00		332 00
W. C. Fox	Axeman and office assistant	2 00 per day	630 00	66 43	696 43
Thomas J. Frederick	Axeman and office assistant	2 00 per day	420 00	164 36	584 36
N. J. Freedman	Axeman and office assistant	2 00 per day	210 00	5 23	215 23
C. H. Fulton	Axeman and office assistant	2 00 per day	314 00	9 40	323 40
William F. Gaffney	Axeman and office assistant	2 00 per day	602 00	289 42	891 42
John H. Garland	Axeman and office assistant	2 00 per day	318 00		318 00
J. J. Glynn	Axeman and office assistant	2 00 per day	590 00		590 00
George A. Green	Axeman and office assistant	2 00 per day	600 00	1 40	601 40
Thomas F. Guidera	Axeman and office assistant	2 00 per day	248 00		248 00
John J. Hagan	Axeman and office assistant	2 00 per day	482 00	14 52	496 52
Frank Haggerty	Axeman and office assistant	2 00 per day	56 00		56 00
M. D. Hanlon	Axeman and office assistant	2 00 per day	340 00	23 39	363 39
Charles H. Harken	Axeman and office assistant	2 00 per day	294 00	14 18	308 18
John J. Harrington	Axeman and office assistant	2 00 per day	60 00	5 21	65 21
A. O. Hollenbeck	Axeman and office assistant	2 00 per day	536 00	36 02	572 02
A. W. Hollenback	Axeman and office assistant	2 00 per day	632 00	124 80	756 80
W. S. Hood	Axeman and office assistant	2 00 per day	386 00	9 70	395 70
T. Sherd. Hose	Axeman and office assistant	2 00 per day	282 00	96 37	378 37
A. P. Hughes	Axeman and office assistant	2 00 per day	630 00	259 24	889 24
Henry Humphrey	Axeman and office assistant	2 00 per day	244 00	2 25	246 25
J. F. Jahn	Axeman and office assistant	2 00 per day	284 00	117 80	401 80
Frank F. Johnson	Axeman and office assistant	2 00 per day	246 00	26 02	272 02
F. O. Johnson	Axeman and office assistant	2 00 per day	84 00		84 00
Albert J. Keating	Axeman and office assistant	2 00 per day	308 00	2 30	310 30
James L. Kehoe	Axeman and office assistant	2 00 per day	628 00	319 58	947 58
J. M. Kells	Axeman and office assistant	2 00 per day	460 00	9 51	469 51
Isaac LaFene	Axeman and office assistant	2 00 per day	306 00	9 10	315 10
Harvey Lape	Axeman and office assistant	2 00 per day	86 00		86 00
Thomas J. Larkin	Axeman and office assistant	2 00 per day	498 00	197 46	695 46
Alphonse P. Lynch	Axeman and office assistant	2 00 per day	398 00		398 00
Raymond A. Lynch	Axeman and office assistant	2 00 per day	306 00	21 26	327 26
Charles B. Magan	Axeman and office assistant	2 00 per day	292 00	19 13	311 13
J. H. Maloney	Axeman and office assistant	2 00 per day	578 00	127 02	705 02
R. J. Maloy	Axeman and office assistant	2 00 per day	368 00		368 00
Aaron Marks	Axeman and office assistant	2 00 per day	568 00	75	568 75
Albert J. Mantica	Axeman and office assistant	2 00 per day	584 00		584 00
D. B. Mattice	Axeman and office assistant	2 00 per day	388 00	7 04	395 04
J. H. McCabe	Axeman and offixe assistant	2 00 per day	618 00	16 44	634 44
Edw. A. McCollough	Axeman and office assistant	2 00 per day	626 00	29 30	655 30
G. J. McKenna	Axeman and office assistant	2 00 per day	244 00	111 16	355 16
Frank J. Mealey	Axeman and office assistant	2 00 per day	326 00	30 70	356 70
J. Raymond Michaels	Axeman and office assistant	2 00 per day	228 00		228 00
W. L. Millias	Axeman and office assistant	2 00 per day	126 00		126 00
Frank E. Moore	Axeman and office assistant	2 00 per day	456 00	155 08	611 08
Nelson Morey	Axeman and office assistant	2 00 per day	20 00	3 64	23 64
John J. Mulhall	Axeman and office assistant	2 00 per day	284 00	21 84	305 84
James J. Murnane	Axeman and office assistant	2 00 per day	206 00		206 00
Edward F. Netterfield	Axeman and office assistant	2 00 per day	296 00	10 87	306 87
Frank C. Packard	Axeman and office assistant	2 00 per day	332 00	8 42	340 42
Howard Paddock	Axeman and office assistant	2 00 per day	454 00		454 00
Ray E. Palmer	Axeman and office assistant	2 00 per day	290 00	40 22	330 22
Charles C. Pulsifer	Axeman and office assistant	2 00 per day	382 00	23 87	405 87
Edward Rawls	Axeman and office assistant	2 00 per day	88 00		88 00
William C. Renkauf	Axeman and office assistant	2 00 per day	68 00		68 00
A. B. Roberts	Axeman and office assistant	2 00 per day	520 00	184 92	704 92
William Robinson	Axeman and office assistant	2 00 per day	352 00	108 40	460 40
Samuel Rosenstein	Axeman and office assistant	2 00 per day	140 00	8 95	148 95
W. J. Ryan	Axeman and office assistant	2 00 per day	524 00	5 82	529 82
George H. Saverese	Axeman and office assistant	2 00 per day	472 00	1 25	473 25
George E. Schaefer	Axeman and office assistant	2 00 per day	222 00	22 13	244 13
F. B. Schneller	Axeman and office assistant	2 00 per day	210 00	10 00	220 00
Charles B. Seib	Axeman and office assistant	2 00 per day	628 00	35 34	663 34
Marshall Semmelman	Axeman and office assistant	2 00 per day	250 00	8 63	258 63
Thomas F. Smyth	Axeman and office assistant	2 00 per day	336 00		336 00
Irving F. Storm	Axeman and office assistant	2 00 per day	282 00	7 29	289 29
John J. Sullivan	Axeman and office assistant	2 00 per day	106 00	53 90	159 90
Michael F. Sullivan	Axeman and office assistant	2 00 per day	298 00	6 55	304 55

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Fred A. Sweet	Axeman and office assistant	$2 00 per day	$318 00	$8 10	$326 10
G. V. Sweet	Axeman and office assistant	2 00 per day	306 00	1 70	307 70
F. H. Thomas	Axeman and office assistant	2 00 per day	624 00	....	624 00
Thomas F. Tracy	Axeman and office assistant	2 00 per day	530 00	200 00	730 21
Robert J. Tuohy	Axeman and office assistant	2 00 per day	136 00	....	136 00
G. L. Van Hagan	Axeman and office assistant	2 00 per day	306 00	7 88	313 88
Ward J. Van Hoesan	Axeman and office assistant	2 00 per day	636 00	....	636 00
John A. Wallace	Axeman and office assistant	2 00 per day	482 00	109 65	591 65
Olin A. Walrath	Axeman and office assistant	2 00 per day	306 00	27 98	333 98
C. F. Wigren	Axeman and office assistant	2 00 per day	230 00	98 78	328 78
A. Alexander	Laborer	2 00 per day	122 00	....	122 00
A. J. Allen	Laborer	2 00 per day	588 00	122 00	710 00
J. K. Ahverson	Laborer	2 00 per day	622 00	....	622 00
H. E. Ball	Laborer	2 00 per day	114 00	....	114 00
J. L. Banker	Laborer	2 00 per day	626 00	....	626 00
R. W. Bissell	Laborer	2 00 per day	618 00	....	618 00
Ira M. Black	Laborer	2 00 per day	136 00	67 05	203 05
A. H. Black	Laborer	2 00 per day	190 00	....	190 00
B. J. Bleistein	Laborer	2 00 per day	142 00	....	142 00
John Blute	Laborer	2 00 per day	594 00	....	594 00
P. J. Blute	Laborer	2 00 per day	522 00	....	522 00
F. Bouck	Laborer	2 00 per day	306 00	....	306 00
W. A. Boyes	Laborer	2 00 per day	458 00	....	458 00
J. H. Boyland	Laborer	2 00 per day	318 00	....	318 00
John Bradley	Laborer	2 00 per day	190 00	6 00	196 00
John T. Bradley	Laborer	2 00 per day	190 00	....	190 00
J. H. Broderick	Laborer	2 00 per day	114 00	....	114 00
J. J. Brown	Laborer	2 00 per day	106 00	....	106 00
Peter Buchanan	Laborer	2 00 per day	216 00	....	216 00
D. Buckley	Laborer	2 00 per day	210 00	....	210 00
B. A. Burdick	Laborer	2 00 per day	186 00	....	186 00
John Butterly	Laborer	2 00 per day	364 00	....	364 00
L. A. Casey	Laborer	2 00 per day	198 00	....	198 00
D. Casper	Laborer	2 00 per day	138 00	1 00	139 00
Joseph W. Child	Laborer	2 00 per day	78 00	....	78 00
John Clark	Laborer	2 00 per day	78 00	....	78 00
T. D. Clancy	Laborer	2 00 per day	700 00	147 43	847 43
Patrick Clinton	Laborer	2 00 per day	150 00	....	150 00
L. E. Cole	Laborer	2 00 per day	162 00	....	162 00
William Colgan	Laborer	2 00 per day	40 00	....	40 00
Edward J. Collins	Laborer	2 00 per day	224 00	....	224 00
J. E. Collins	Laborer	2 00 per day	130 00	....	130 00
Edward Cook	Laborer	2 00 per day	158 00	....	158 00
C. O. Conklin	Laborer	2 00 per day	106 00	2 01	108 01
L. E. Conklin	Laborer	2 00 per day	84 00	5 14	89 14
Edward Conners	Laborer	2 00 per day	190 00	....	190 00
Dennis Connors	Laborer	2 00 per day	112 00	....	112 00
E. D. Conroy	Laborer	2 00 per day	38 00	1 01	39 01
Leon Corregan	Laborer	2 00 per day	38 00	....	38 00
T. V. Costello	Laborer	2 00 per day	600 00	....	600 00
G. W. Craige	Laborer	2 00 per day	132 00	....	132 00
John T. E. Davis	Laborer	2 00 per day	172 00	....	172 00
W. H. Darcy	Laborer	2 00 per day	158 00	....	158 00
C. H. Darke	Laborer	2 00 per day	50 00	....	50 00
T. Derby	Laborer	2 00 per day	38 00	....	38 00
J. E. Dempsey	Laborer	2 00 per day	262 00	....	262 00
Peter Dexheimer	Laborer	2 00 per day	106 00	....	106 00
Gaston DeBellefroid	Laborer	2 00 per day	444 00	6 88	450 88
A. W. DeRevere	Laborer	2 00 per day	84 00	15 14	99 14
James W. Diamond	Laborer	2 00 per day	104 00	....	104 00
John Donovan	Laborer	2 00 per day	130 00	....	130 00
John Donovan	Laborer	2 00 per day	676 00	....	676 00
John T. Donovan	Laborer	2 00 per day	210 00	....	210 00
Edw. J. Donohue	Laborer	2 00 per day	198 00	1 83	199 83
Michael Donohue	Laborer	2 00 per day	262 00	....	262 00
Peter Donnelly	Laborer	2 00 per day	174 00	....	174 00
W. F. Doody	Laborer	2 00 per day	128 00	....	128 00
G. I. Doty	Laborer	2 00 per day	130 00	....	130 00
J. R. Draper	Laborer	2 00 per day	134 00	....	134 00
Frank Driscoll	Laborer	2 00 per day	46 00	18 40	64 40
George Duell	Laborer	2 00 per day	72 00	....	72 00
John C. Duggan	Laborer	2 00 per day	420 00	4 81	424 81
Burt Dunleavy	Laborer	2 00 per day	628 00	....	628 00
Edw. A. Dwyer	Laborer	2 00 per day	112 00	1 90	113 90
Martin Eagan	Laborer	2 00 per day	186 00	2 70	188 70
Bert. Eldridge	Laborer	2 00 per day	48 00	....	48 00
H. E. Ensign	Laborer	2 00 per day	70 00	....	70 00

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
W E. Everett, Jr.	Laborer	$2 00 per day	$226 00	....	$226 00
Joseph Eyes	Laborer	2 00 per day	198 00	....	198 00
E. A. Faille	Laborer	2 00 per day	628 00	....	628 00
P. P. Farnum	Laborer	2 00 per day	206 00	....	206 00
Stephen Feenan	Laborer	2 00 per day	106 00	....	106 00
John Fields	Laborer	2 00 per day	326 00	....	326 00
James I. Fiesel	Laborer	2 00 per day	82 00	....	82 00
Delos Finster	Laborer	2 00 per day	82 00	....	82 00
Edward J. Flanagan	Laborer	2 00 per day	192 00	....	192 00
Charles Fogarty	Laborer	2 00 per day	24 00	....	24 00
P. L. Fritz	Laborer	2 00 per day	128 00	....	128 00
John T. Gallagher	Laborer	2 00 per day	204 00	....	204 00
Thomas W. Gibbons	Laborer	2 00 per day	636 00	$7 50	643 50
Thomas Gleason	Laborer	2 00 per day	138 00	....	138 00
Christy Graham	Laborer	2 00 per day	502 00	....	502 00
R. A. Graham	Laborer	2 00 per day	138 00	....	138 00
W. E. Green	Laborer	2 00 per day	132 00	....	132 00
Alex. Greenwald	Laborer	2 00 per day	440 00	....	440 00
F. I. Gonyo	Laborer	2 00 per day	82 00	....	82 00
Martin Hagan	Laborer	2 00 per day	506 00	51 58	557 58
Cornelus Haley	Laborer	2 00 per day	400 00	....	400 00
Fred Haggerty	Laborer	2 00 per day	114 00	....	114 00
E. T. Hayes	Laborer	2 00 per day	198 00	....	198 00
R. T. Hayes	Laborer	2 00 per day	52 00	....	52 00
James H. Haven	Laborer	2 00 per day	130 00	11 50	141 50
Thomas Hanify	Laborer	2 00 per day	158 00	....	158 00
R. R. Harrington	Laborer	2 00 per day	96 00	....	96 00
D. J. Hartnett	Laborer	2 00 per day	346 00	....	346 00
John S. Hazelton	Laborer	2 00 per day	82 00	....	82 00
T. F. Hillary	Laborer	2 00 per day	190 00	....	190 00
Silas Hilton	Laborer	2 00 per day	130 00	....	130 00
Ephriam Herrick	Laborer	2 00 per day	128 00	....	128 00
William Herbert	Laborer	2 00 per day	356 00	....	356 00
Frank Hester	Laborer	2 00 per day	132 00	4 72	136 72
Clarence L. Hitt	Laborer	2 00 per day	296 00	....	296 00
D. A. Hogeboom	Laborer	2 00 per day	70 00	....	70 00
M. J. Hoy	Laborer	2 00 per day	270 00	....	270 00
T. J. Hurley	Laborer	2 00 per day	68 00	....	68 00
Chris. Hussey	Laborer	2 00 per day	262 00	....	262 00
Fred Isaacs	Laborer	2 00 per day	70 00	....	70 00
Philip Jacobs	Laborer	2 00 per day	174 00	19 96	193 96
L. Jacobs	Laborer	2 00 per day	52 00	....	52 00
William M. Johnson	Laborer	2 00 per day	20 00	....	20 00
Frank D. Kelly	Laborer	2 00 per day	70 00	....	70 00
Peter P. Kelly	Laborer	2 00 per day	626 00	....	626 00
C. Kelleher	Laborer	2 00 per day	80 00	....	80 00
Thomas F. Kiley	Laborer	2 00 per day	70 00	....	70 00
John P. Kivlen	Laborer	2 00 per day	172 00	....	172 00
William T. Kirby	Laborer	2 00 per day	230 00	....	230 00
Lothair Kleen	Laborer	2 00 per day	134 00	7 61	141 61
D. C. Kline	Laborer	2 00 per day	54 00	....	54 00
H. J. Koefman	Laborer	2 00 per day	24 00	....	24 00
G. K. Korwan	Laborer	2 00 per day	76 00	....	76 00
Michael Lang	Laborer	2 00 per day	586 00	23 41	609 41
E. J. Latus	Laborer	2 00 per day	158 00	....	158 00
George Lanahan	Laborer	2 00 per day	174 00	10 58	184 58
T. J. Lanahan	Laborer	2 00 per day	34 00	....	34 00
David Lockwood	Laborer	2 00 per day	310 00	....	310 00
Simeon Lodewick	Laborer	2 00 per day	200 00	....	200 00
John Loughran	Laborer	2 00 per day	662 00	43 29	705 29
Vincent J. Loughran	Laborer	2 00 per day	134 00	....	134 00
E. P. Law	Laborer	2 00 per day	360 00	25 15	385 15
Lewis J. Ludwig	Laborer	2 00 per day	602 00	35 40	637 40
S. J. Magee	Laborer	2 00 per day	52 00	....	52 00
William Mahoney	Laborer	2 00 per day	130 00	....	130 00
Daniel Markham	Laborer	2 00 per day	294 00	....	294 00
Thomas J. Martin	Laborer	2 00 per day	130 00	....	130 00
Aaron Matthias	Laborer	2 00 per day	140 00	....	140 00
J. M. Macdonald	Laborer	2 00 per day	390 00	80 68	470 68
Henry MacFarlane	Laborer	2 00 per day	394 00	....	394 00
Thomas MacMurray	Laborer	2 00 per day	106 00	....	106 00
Daniel McBride	Laborer	2 00 per day	54 00	....	54 00

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
T. H. McCabe	Laborer	$2 00 per day	$8 00		$8 00
Owen A. McCabe	Laborer	2 00 per day	124 00		124 00
Frank McCarthy	Laborer	2 00 per day	122 00		122 00
John McCarthy	Laborer	2 00 per day	130 00	$53 00	183 00
W. A. McDermott	Laborer	2 00 per day	162 00		162 00
Edward F. McDonald	Laborer	2 00 per day	82 00		82 00
Thomas P. McEvoy	Laborer	2 00 per day	622 00	321 00	943 00
Thomas F. McGaughnea	Laborer	2 00 per day	140 00		140 00
John C. McGee	Laborer	2 00 per day	26 00	13 00	39 00
Thomas J. McGee	Laborer	2 00 per day	174 00	91 50	265 50
P. J. McGowan	Laborer	2 00 per day	120 00		120 00
John C. McGuire	Laborer	2 00 per day	126 00	9 42	135 42
W. D. McKenna	Laborer	2 00 per day	186 00		186 00
Alex. McMartin	Laborer	2 00 per day	628 00		628 00
Clarence McNeil	Laborer	2 00 per day	94 00		94 00
Thomas Mesick	Laborer	2 00 per day	82 00		82 00
C. H. Millard	Laborer	2 00 per day	70 00		70 00
D. J. Minahan	Laborer	2 00 per day	652 00		652 00
John Mitchell	Laborer	2 00 per day	68 00	4 03	72 03
Thomas F. Mooney	Laborer	2 00 per day	54 00		54 00
B. W. Mosher	Laborer	2 00 per day	82 00		82 00
H. S. Moore, Jr	Laborer	2 00 per day	540 00		540 00
David Morris	Laborer	2 00 per day	22 00		22 00
G. T. Morrison	Laborer	2 00 per day	254 00	1 77	255 77
Thomas E. Mullen	Laborer	2 00 per day	8 00		8 00
J. J. Mulligan	Laborer	2 00 per day	630 00		630 00
A. B. Murphy	Laborer	2 00 per day	114 00		114 00
Thomas Murphy	Laborer	2 00 per day	174 00		174 00
J. B. Murphy	Laborer	2 00 per day	40 00		40 00
Chris. Nadig	Laborer	2 00 per day	82 00		82 00
Michael O'Keefe	Laborer	2 00 per day	224 00		224 00
J. W. O'Neil	Laborer	2 00 per day	46 00		46 00
John Ostrander	Laborer	2 00 per day	246 00		246 00
Hugh Owens	Laborer	2 00 per day	198 00	6 09	204 09
Selah Page	Laborer	2 00 per day	242 00		242 00
Leonard Paige	Laborer	2 00 per day	732 00	447 99	1,179 99
Heber Palmer	Laborer	2 00 per day	106 00		106 00
H. S. Parsons	Laborer	2 00 per day	194 00		194 00
C. A. Parry	Laborer	2 00 per day	52 00		52 00
Edward Patterson	Laborer	2 00 per day	148 00		148 00
V. B. Patterson	Laborer	2 00 per day	226 00		226 00
William Pease	Laborer	2 00 per day	158 00		158 00
James Quigg	Laborer	2 00 per day	122 00		122 00
J. L. Quinn	Laborer	2 00 per day	170 00		170 00
E. D. Ransom	Laborer	2 00 per day	78 00		78 00
Thomas Rattoone	Laborer	2 00 per day	646 00		646 00
John P. Record	Laborer	2 00 per day	128 00	2 98	130 98
J. P. Reis	Laborer	2 00 per day	524 00		524 00
William Reilly	Laborer	2 00 per day	54 00	1 50	55 50
Charles Riley	Laborer	2 00 per day	106 00		106 00
W. H. Ronald	Laborer	2 00 per day	202 00		202 00
James H. Roney	Laborer	2 00 per day	308 00		308 00
James J. Rooney	Laborer	2 00 per day	186 00		186 00
John J. Ryan	Laborer	2 00 per day	598 00	208 30	806 30
E. A. Sackrider	Laborer	2 00 per day	98 00		98 00
Henry Sager	Laborer	2 00 per day	546 00		546 00
John H. Schram	Laborer	2 00 per day	376 00		376 00
John R. Shea	Laborer	2 00 per day	106 00		106 00
Floy T. Sheldon	Laborer	2 00 per day	130 00	1 83	131 83
Van D. Sheldon	Laborer	2 00 per day	48 00		48 00
Arch. H. Sherlock	Laborer	2 00 per day	186 00	7 58	193 58
E. J. Sherman	Laborer	2 00 per day	66 00		66 00
J. L. Sherry	Laborer	2 00 per day	82 00		82 00
Fred T. Smith	Laborer	2 00 per day	132 00		132 00
John T. Smith	Laborer	2 00 per day	128 00		128 00
Richard Smith	Laborer	2 00 per day	650 00		650 00
Sherrill E. Smith	Laborer	2 00 per day	104 00		104 00
W. E. Smyth	Laborer	2 00 per day	46 00		46 00
Emmett Snell	Laborer	2 00 per day	130 00		130 00
G. M. Steinert	Laborer	2 00 per day	108 00		108 00
L. Sterne	Laborer	2 00 per day	678 00		678 00
W. H. Stevens	Laborer	2 00 per day	138 00		138 00

Improvement of Public Highways—(Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Conrad Stock	Laborer	$2 00 per day	$130 00	....	$130 00
Thomas Sullivan	Laborer	2 00 per day	262 00	....	262 00
Joseph Sullivan	Laborer	2 00 per day	314 00	....	314 00
Dennis Sweeney	Laborer	2 00 per day	292 00	....	292 00
Cuyler Ten Eyck	Laborer	2 00 per day	542 00	....	542 00
Joseph Tearney	Laborer	2 00 per day	70 00	....	70 00
G. H. Tobias	Laborer	2 00 per day	78 00	....	78 00
Leonard Tracy	Laborer	2 00 per day	82 00	....	82 00
E. A. Traver	Laborer	2 00 per day	178 00	....	178 00
Thomas A. Tydeman	Laborer	2 00 per day	62 00	....	62 00
L. Van Dyke	Laborer	2 00 per day	150 00	....	150 00
B. P. Vos	Laborer	2 00 per day	104 00	....	104 00
Jerome S. Wallace	Laborer	2 00 per day	480 00	....	480 00
James B. Walsh	Laborer	2 00 per day	616 00	....	616 00
William Walters	Laborer	2 00 per day	576 00	....	576 00
Benjamin Watson	Laborer	2 00 per day	70 00	....	70 00
W. T. Whitehead	Laborer	2 00 per day	126 00	....	126 00
F. H. Willets	Laborer	2 00 per day	74 00	....	74 00
Alfred F. Wilson	Laborer	2 00 per day	110 00	$14 00	124 00
Howard Young	Laborer	2 00 per day	54 00	....	54 00
			$388,436 90	$47,418 03	$435,854 93

Incidental Expenses.

Stationery and printing	$7,247 55	
Livery	32,807 00	
Fuel and light	565 97	
Postage	905 44	
Office rent	5,108 77	
Telephone and telegraph	3,674 23	
Miscellaneous	23,888 99	74,197 95
Total		$510,052 88

Maintenance and Repairs of Improved Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

Road No.	Name of road.	Town.	County.	Construction.	Engineering.	Total.
4	Lebanon Pittsfield	New Lebanon	Columbia	$224 98		$224 98
7	Delaware Turnpike, section 1	Bethlehem	Albany	733 58	$36 68	770 26
11	Troy and Greenbush, section 1	North Greenbush	Rensselaer	60 86	3 04	63 90
16	[illegible] 1	Shandaken	Ulster	8,227 01	317 50	8,544 52
17	[illegible]	Greenburg	Westchester	360 00		360 00
18	[illegible]on 1	Greenburg	Westchester	3,760 22	93 85	3,854 07
19	[illegible]ns	Mamaroneck, Scarsdale	Westchester	2,105 75		2,105 75
20	[illegible]d	North Castle	Westchester	1,287 20		1,287 20
22	Loudon	Colonie	Albany	6,348 97	244 20	6,593 17
25	Troy and Brunswick	Brunswick	Rensselaer	5,217 54	222 50	5,440 04
31	[illegible]tion 3	Shandaken	Ulster	1,903 32	47 25	1,950 57
32	[illegible]e	Florida	Montgomery	1,369 10	70 00	1,439 10
33	[illegible]	Johnstown, Mayfield	Fulton	1,160 78		1,160 78
34	[illegible]ction 2	Greenburg, Mt Pleasant	Westchester	1,026 42		1,026 42
35	[illegible]k	North Castle	Westchester	1,690 75		1,690 75
36	[illegible]	Middletown	Delaware	39 95		39 95
37	Saugerties-Woodstock, section 1	Woodstock	Ulster	3,555 49	61 00	3,616 49
38	Saugerties Woodstock, section 2	Saugerties	Ulster	4,062 97	49 40	4,112 37
39	Waterford, section 1		Saratoga	3,298 00		3,298 00
41	Delaware Turnpike, section 2		Albany	867 09	42 25	909 34
42	Newburg Woodbury	[illegible]l, Wood-	Orange	1,194 49	59 72	1,254 21
43	Cochecton Turnpike, section 2	[illegible]r	Orange	1,142 06	57 10	1,199 16
44	Goshen Florida		Orange	665 72	41 80	707 52
45	Middletown-Pine Bush	Crawford, Wallkill	Orange	741 52	37 08	778 60
46	Turners Monroe	Monroe	Orange	388 44	22 00	410 44
50	Armonk Mt Kisco	North Castle, New Castle	Westchester	3,588 73	50 97	3,639 70
51	Mt. Kisco Bedford	Bedford	Westchester	2,825 29		2,825 29
52	Unionville-McKells Corners	Mt. Pleasant	Westchester	1,773 00		1,773 09
53	[illegible]liffe	Ossining, Mt. Pleasant	Westchester	836 35		836 35
55	[illegible]	Nassau	Rensselaer	548 19		548 19
58	[illegible]	Moreau	Saratoga	6,267 21		6,267 21
59	[illegible]	Half Moon	Saratoga	4,763 56		4,763 56
64	[illegible]	Montgomery	Orange	509 25	25 46	534 71
65	[illegible]	Montgomery, Hamptonburg, Goshen	Orange	832 31	37 72	870 03
73	[illegible]	Duanesburg	Schenectady	481 58		481 58
77	[illegible]	Brunswick, No Greenbush	Rensselaer	7,011 24	75 00	7,086 24
84	[illegible] 3	Brunswick	Rensselaer	2,824 45		2,824 45
85	[illegible]	Fort Edward	Washington	2,056 50	102 82	2,159 33

90			Rockland	638 17		638 17
91			Rockland	489 50	24 47	513 97
92			Albany	336 49		336 49
93			Orange	581 16	29 06	610 22
95		allkill, Goshen	Orange	740 08	35 40	775 48
96	2		Montgomery	15 50		15 50
102			Rensselaer	981 09		981 09
103			Washington	340 60		340 60
105			Schenectady	485 15	24 26	509 41
106			Schenectady	897 26		897 26
107			Montgomery	566 68		566 68
108			Montgomery	1,345 03		1,345 03
109			Fulton	466 87		466 87
113			Orange	144 42		144 42
114			Orange	10 82		10 82
115	1	iroe	Orange	652 27	34 59	686 86
116			Ulster	196 50		196 50
117			Ulster	1,015 93	50 80	1,066 73
119			Albany	5,995 08	299 75	6,294 83
120		Canajoharie	Montgomery	1,388 72	59 44	1,448 16
133		Manheim	Herkimer	3,963 64		3,963 64
135		Poughkeepsie, Hyde Park	Dutchess	2,070 47		2,070 47
142	3	Saugerties	Ulster	3,782 69	189 13	3,971 82
152		Mohawk	Montgomery	21 27		21 27
153		Newburg, New Windsor, Hamptonburg	Orange	1,084 22	94 21	1,178 43
154	Chester–Vail's Gate	Chester, Bloomingrove, New Windsor, Cornwall	Orange	47 00		47 00
155	Fonda, West	Mohawk	Montgomery	238 72	22 00	260 72
156	Chester–Goshen	Chester, Goshen	Orange	79 39		79 39
157	Woodbury–Central Valley	Woodbury	Orange	101 54		101 54
158	Northampton	Amsterdam	Montgomery	18 25		18 25
159	Middletown State Hill	Wawayanda	Orange	273 73	15 65	289 38
160	Slate Hill–Unionville	Wawayanda, Minnisink	Orange	135 15		135 15
162		Oneonta	Otsego	2,345 25	117 26	2,462 51
176		Colonie	Albany	1,094 97		1,094 97
178	tion 3	Bethlehem, New Scotland	Albany	1,465 66		1,465 66
179		Rotterdam, Niskayuna	Albany	75 00		75 00
180		Amsterdam	Montgomery	562 71		562 71
192		Albany, Berne	Albany	84 50		84 50
193		Bethlehem	Albany	5,749 63	181 50	5,931 13
194		Poestenkill, Sand Lake	Rensselaer	517 79		517 79
195	Sand Lake	Sand Lake, Poestenkill, North Greenbush	Rensselaer	1,005 55		1,005 55
196	East Nassau	Nassau	Rensselaer	523 77		523 77
197	Brick Church Rock Hollow	Brunswick	Rensselaer	898 23		898 23
198	Delaware Turnpike, section 4	New Scotland, Berne	Albany	1,057 89		1,057 89
199	Delaware Turnpike, section 5	Westerlo, Rensselaerville	Albany	602 87		602 87

Maintenance and Repairs of Improved Public Highways — (Continued).

Road No	Name of road.	Town.	County.	Construction.	Engineering.	Total.
201	Troy Poestenkill	North Greenbush, Poestenkill	Rensselaer	$1,890 89		$1,890 89
202	Boston-Albany	East Greenbush, Schodack	Rensselaer	2,157 38		2,157 38
216	Roxbury	Roxbury	Delaware	23 40		23 40
220		Worcester	Otsego	38 63		38 63
222		Wappinger	Dutchess	2,673 98	$133 70	2,807 68
223		Poughkeepsie	Dutchess	935 86	46 69	982 55
227		Brunswick	Rensselaer	1,620 30		1,620 30
228		Saugerties, Ulster	Ulster	675 19		675 19
240	Waterford Cohoes	Waterford	Saratoga	176 50		176 50
241	Saratoga Ballston	Saratoga Springs, Milton	Saratoga	25 00		25 00
242	Saratoga-Glens Falls, section 2	Greenfield, Milton	Saratoga	39 12		39 12
249	Old Plank	Perth	Fulton	87 75		87 75
284	Averill Park Crooked Lake	Sand Lake	Rensselaer	20 00		20 00
287	Rensselaer Best	North Greenbush, East Greenbush	Rensselaer	998 75		998 75
288	Troy-Sand Lake, section 2	Poestenkill, North Greenbush	Rensselaer	3,954 59		3,954 59
300	De Graff Corners-Sherburn Corners	Florida	Montgomery	19 50		19 50
302		Mohawk	Montgomery	46 50		46 50
316		Oneonta	Otsego	29 00	4 40	33 40
318		Milford	Otsego	446 15	22 31	468 46
319		Maryland	Otsego	237 66	11 88	249 54
340		Greenfield	Saratoga	40 00		40 00
342		Pawling	Dutchess	105 37	5 27	110 64
344		North East	Dutchess	84 75		84 75
361	on 1	Johnstown	Fulton	349 25		349 25
366		New Scotland	Albany	110 50		110 50
367		New Scotland	Albany	181 50	10 72	192 22
417		, Caldwell	Warren	368 00		368 00
436			Nassau	1,663 11		1,663 11
551			Dutchess	1,229 18		1,229 18
545			Nassau	658 95		658 95
577	Schenectady-Guilderland	Rotterdam	Schenectady	607 02	30 35	637 37
				$152,330 97	$3,140 18	$155,471 15
	Instruments, tools and appliances					1,925 00
	Total maintenance expenditures					$157,396 15

"Money System" Repairs of Highways.

Chapter 700, Laws of 1905, and amendatory laws.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Stephen Ryan	Special examiner of highways	$12 00 per day	$3,804 00	$1,462 78	$5,266 78
C. F. Champlain	Supervisor of highways	5 00 per day	1,635 00	1,120 18	2,755 18
I. P. Cribb	Supervisor of highways	5 00 per day	1,575 00	994 17	2,569 17
Samuel Grennon	Supervisor of highways	5 00 per day	1,570 00	997 94	2,567 94
F. J. McGuire	Supervisor of highways	5 00 per day	1,570 00	1,134 97	2,704 97
B. M. Patten	Supervisor of highways	5 00 per day	1,570 00	1,303 45	2,873 45
C. B. Perry	Supervisor of highways	5 00 per day	1,570 00	1,293 65	2,863 65
Peter Seeber	Supervisor of highways	5 00 per day	1,510 00	965 48	2,475 48
J. C. Van Arsdale	Supervisor of highways	5 00 per day	1,570 00	919 00	2,489 00
John Gick	Auditor of highway accounts	4 00 per day	1,256 00	864 89	2,120 89
E. M. Howland	Auditor of highway accounts	4 00 per day	1,284 00	6 45	1,290 45
Valentina Brothers	Stenographer	83 33 per month	999 96	....	999 96
E. A. Crowl	Stenographer	83 33 per month	249 99	....	249 99
M. G. Harrington	Stenographer	75 00 per month	150 00	....	150 00
G. C. Davis	Stenographer	50 00 per month	158 62	....	158 62
Lucy McCormack	Stenographer	50 00 per month	437 42	....	437 42
L. G. Cantwell	Temporary stenographer	2 00 per day	10 00	....	10 00
Martina Devlin	Temporary stenographer	2 00 per day	92 00	....	92 00
C. A. Hulburt	Inspector of highways	4 50 per day	1,280 50	7 22	1,287 72
Fred Buck	Inspector of highways	4 00 per day	572 00	218 98	790 98
John Guyer	Inspector of highways	4 00 per day	703 00	68 71	771 71
W. G. Edgerton	Inspector of highways	3 50 per day	198 50	....	198 50
B. E. Hodges	Inspector of highways	3 50 per day	273 00	....	273 00
H. P. Pitcher	Chainman	2 50 per day	67 50	....	67 50
J. J. Craven	Axeman	2 00 per day	390 00	....	390 00
W. R. Davis	Axeman	2 00 per day	72 00	....	72 00
W. S. Hood	Axeman	2 00 per day	68 00	....	68 00
Alphonse Lynch	Axeman	2 00 per day	104 00	....	104 00
Lehon Corregon	Axeman	2 00 per day	52 00	....	52 00
			$24,792 49	$11,358 35	$36,150 84
Incidental Expenses.					
Stationary and printing				$1,830 96	
Livery				2,187 10	
Postage				1,904 38	
Telephone and telegraph				1,580 88	
Miscellaneous				793 84	
					8,297 16
Total					$44,448 00

Surveys for State Court of Claims.

Chapter 578, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Robert E. Horton	Resident engineer	$2,400 per year	$116 13	$30 80	$146 93
John A. O'Connor	Resident engineer	2,400 per year	200 00	230 01	430 01
. H. Chilvers	Engineering draftsman	5 00 per day	15 00		15 00
W. R. Gordon	Engineering draftsman	5 00 per day	105 00	90 94	195 94
W. A. Treadwell	Engineering draftsman	4 00 per day	84 00		84 00
D. B. LaDu	Assistant engineer	6 00 per day	36 00	24 38	60 38
A. M. Wait	Inspector of public works	5 00 per day	10 00	5 50	15 50
D. J. Brown	Axeman and office assistant	2 00 per day	36 00		36 00
L. F. Cashman	Axeman and office assistant	2 00 per day	22 00		22 00
J. F. Jahn	Axeman and office assistant	2 00 per day	22 00		22 00
J. H. Maloney	Axeman and office assistant	2 00 per day	36 00	46 78	82 78
J. J. Sullivan	Axeman and office assistant	2 00 per day	36 00	46 78	82 78
J. J. Allen	Laborer	2 00 per day	36 00		36 00
John Mitchell	Laborer	2 00 per day	34 00		34 00
J. J. Ryan	Laborer	2 00 per day	36 00		36 00
			$824 13	$475 19	$1,299 32
Incidental Expenses.					
Livery				$100 00	
Postage				6 00	
Telephone and telegraph				1 07	
Miscellaneous				21 65	
					128 72
Total					$1,428 04

Topographic Survey.

Chapter 578, Laws of 1907.

In Coöperation with United States Geological Survey.

Anibal, L. B	$44 00
Austin, G. A	23 00
Bannon, T. M	141 82
Beaman, W. M	250 28
Blanchard, Gail	30 00
Brown Bros.	80 00
Brundage, P. W	38 00
Chaney, R. G., Jr	118 16
Chapman, R. H	80 36
Cooke, C. E	667 16
Conway, J. J	111 00
Daugherty, S. H	12 00
Delgardo, M. P., Jr	76 50
Director U. S. Geological Survey	86 40
Dudley, C. L	26 25
Demond, O	7 00
Dodge	12 66
Eastwood, E. M	213 00
Everett, Chris	13 50
Fletcher, L. C	369 41
Frangott, F. J	96 50
Gayetty, J. I	162 66
Gill & Wesley	22 50
Graff, Fred., Jr	239 81
Gurney, F. M	76 50
Hadden, A	60 00
Harms, R. J	56 00
Hall, C. L	46 00
Houghton, I. B	37 00
Jacobs, W. J	10 50
Johnson, Chester	12 00
Jones, Chas	84 38
Kirby, P. L	96 00
Lawrence, Edw	10 50
Lord, Sidney	22 00
Magee, C. C	62 00
McAllister, C. P	33 13

Topographic Survey — (Continued).

McCormick, E. J.	$10 00
McCune, Frank	59 00
McNair, A. F.	509 50
Monroe, E. D.	427 83
Morey, W. H. S	301 39
Northrup, F. B.	303 50
O'Neil, J. D	28 00
Pease, A. W.	229 50
Peters, E. B	199 00
Petitt, I. W.	473 50
Quinn, T. M.	254 83
Reid, A. A., Jr.	334 50
Robinson, F. N.	16 50
Robinson, K. E	263 83
Ryan, M. M.	57 00
Salisbury, John	17 50
Sammons, J. R	447 83
Seitz, R. C.	247 52
Shannon & Dayton	25 00
Simmons, O	10 50
Semper, C. H	460 66
Smallidge, F. N	11 50
Stephens, J. T	153 00
Thompson, Jos	42 00
Van Arnam, G. E	32 00
Weasmer, W. H	17 00
Whitman, J. M., Jr.	173 20
Wickham, D. B	167 50
Williams, L. K	25 50
Wright, G. M.	11 00
Young, W. D.	191 00
Total	$9,028 57

Hydrographic Survey.

Chapter 578, Laws of 1907; chapter 466, Laws of 1908.

Adams, C. R	$25 55
Allen, C. E.	28 95
Allen, Lester	5 00
Barrows, H. K	573 75
Bolster, R. H	11 14
Brett, George M	252 68
Conron, Edward	7 50
Crain, R. W.	24 00
Gates, O. A.	36 00
Goff, F. M.	9 80
Ham, Wesley	70 00
Hannon, Chris	63 34
Henry, John V	24 00
Hoyt, W. G.	20 60
LaRue, Joseph	60 00
McAstocker, John	75 00
Monroe, W. R.	15 00
Orcutt, D. L.	48 00
Pierson, John B	48 72
Pratt, F. W. B.	7 50
Sarasie, Lester, Jr	45 00
Skehan, M. E	41 33
Smith, H. L.	60 00
Stevens, G. C	13 50
Thomas, Fred	22 50
Waitt, C. A.	66 66
Wood, D. M	274 96
Total	$1,930 48

Mohawk Street Bridge, Waterford.

Chapter 265, Laws of 1908.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
P. W. O'Grady....	Assistant engineer.....	$6 00 per day	$378 00	$16 75	$394 75
Incidental Expenses.					
Stationery and printing..........					56 05
Total..........					$450 80

SUMMARY.

The foregoing tables are summarized as follows:

Ordinary Repairs to Canals.

1. Erie canal, chapter 577, Laws of 1907..........	$8,131 16
2. Champlain canal, chapter 577, Laws of 1907..........	3,868 84

Construction of Barge Canal.

3. Head office account, chapter 147, Laws of 1903; chapter 143, Laws of 1905; chapter 172, Laws of 1907..........	243,931 29
4. Erie canal, chapter 147, Laws of 1903; chapter 143, Laws of 1905; chapter 172, Laws of 1907..........	138,067 27
5. Champlain canal, chapter 147, Laws of 1903; chapter 143, Laws of 1905; chapter 172, Laws of 1907..........	78,736 89

Improvement of Public Highways.

6. Improvement of public highways, chapter 115, Laws of 1898, and amendatory laws..........	510,052 88
7. Maintenance and repairs of improved public highways, chapter 115, Laws of 1898, and amendatory laws..........	157,396 15
8. "Money system" repairs of highways, chapter 577, Laws of 1907; chapter 578, Laws of 1907..........	44,448 00

Bureau of Bridges.

9. Bureau of bridges, chapter 686, Laws of 1906; chapter 578, Laws of 1907.	2,622 49

Special Surveys.

10. Examination of monuments and maps, chapter 686, Laws of 1906; chapter 466, Laws of 1908..........	594 59
11. Survey for State Court of Claims, chapter 686, Laws of 1906; chapter 578, Laws of 1907..........	1,428 04
12. Topographic survey, chapter 578, Laws of 1907; chapter 466, Laws of 1908..........	9,028 57
13. Hydrographic survey, chapter 578, Laws of 1907; chapter 466, Laws of 1908..........	1,930 48
14. Mohawk street bridge, Waterford, chapter 265, Laws of 1908..........	450 80
Total..........	$1,200,687 45

TABLE OF CONTRACTS COMPLETED ON THE EASTERN DIVISION DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908.

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Final payment.
Orange County Road Construction Co	July 20, 1906	Chester–Vail's Gate road, No 154–A, Orange county	$25,833 00	$26,463 80
Orange County Road Construction Company	July 20, 1906	Woodbury–Central Valley road, No. 157, Orange county	18,367 80	20,237 07
...ction	June 18, 1904		48,250 00	69,206 64
	July 9, 1906		25,900 00	28,050 70
	June 29, 1906		40,800 00	53,661 18
	Oct. 1, 1906		57,000 00	74,080 00
	July 11, 1906	...ounty	63,439 00	81,434 09
	July 7, 1906		52,250 00	60,560 15
...t and	July 9, 1906	...y.	12,700 00	12,810 78
	Aug 30, 1906		46,775 00	46,559 84
	July 3, 1906		21,138 40	32,418 22
...pany	July 13, 1906		30,669 00	33,401 66
	July 13, 1906	...county	8,513 40	8,558 20
...and	July 9, 1906	Mechanicville–Stillwater road, No. 243, Saratoga county	18,000 00	25,556 30
...and	July 9, 1906	Saratoga–Schuylerville road, No 244, Saratoga county	55,000 00	53,623 43
	July 12, 1906	Gloversville Mecco–Phelps road, No. 246, Fulton county	17,203 07	17,098 82
...and	July 9, 1906	Johnstown–Keck Center (section 2) road, No. 247, Fulton county	40,000 00	38,225 71
	Sept. 1, 1906	Gloversville–Broadalbin road, No. 248, Fulton county	16,243 00	16,091 18
...and	July 9, 1906	...y	36,000 00	48,221 77
	July 6, 1906		55,894 00	59,496 25
	Aug. 1, 1906		33,000 00	39,057 16
	July 6, 1906	...county	43,233 00	44,720 26
	July 6, 1906	...county.	33,711 00	33,373 14
	Aug. 30, 1906		56,865 00	59,792 95
...ction	Sept. 4, 1906	Greenville–Port Jervis road, No. 283, Orange county	57,350 00	63,799 50
[illegible]	July 2, 1906	Averill Park–Crooked Lake road, No. 284, Rensselaer county	27,660 00	32,132 83

Thomas H. Karr	July 7, 1906	Nassau-Brainard road, No. 285, Rensselaer county	31,500 00	31,764 64
	Aug. 30, 1906	Rensselaer-Best road, No. 287, Rensselaer county	35,349 00	40,203 73
; and				
	July 9, 1906	nty	15,000 00	14,824 10
	July 11, 1906	ntgomery county	27,000 00	26,372 10
	Sept. 3, 1907		18,705 95	19,184 46
	July 3, 1906	ounty	56,500 00	63,199 60
	Sept. 3, 1907		51,927 30	51,385 12
	Sept. 3, 1907		58,579 45	58,214 19
	Jan. 10, 1908		43,009 69	47,690 65
ction				
	Sept. 4, 1906	) road, No. 312, Orange county	36,400 00	37,333 20
	Sept. 3, 1907	road, No 313, Orange county	51,072 20	51,389 00
	June 30, 1906	, Otsego county	37,000 00	52,782 85
; and				
	July 9, 1906		26,000 00	29,842 80
	July 10, 1906		19,967 75	24,261 79
	June 30, 1906		34,400 00	34,760 92
	July 20, 1906	county	42,000 00	47,164 20
	July 20, 1906	county	34,690 00	35,898 45
	July 6, 1906		51,000 00	52,920 83
John W. Polcaro	July 6, 1906		23,100 00	23,047 69
	Aug. 28, 1906		7,500 00	7,229 60
	July 10, 1906		14,600 00	16,748 34
	July 9, 1906		20,149 00	20,267 60
	Sept. 3, 1907		15,346 70	19,085 05
	Sept. 3, 1907		10,480 40	11,193 85
	July 12, 1906		24,036 50	24,441 26
	Sept. 3, 1907		23,582 40	23,588 24
	Dec. 18, 1907		57,546 95	58,851 06
racting				
	Sept. 3, 1907		50,790 01	54,112 26
Co.	Sept. 20, 1907		14,787 65	15,732 20
	Sept. 4, 1907	nty	34,225 77	35,640 72
	July 10, 1906		72,500 00	77,448 45
	July 10, 1906		82,500 00	103,871 00
	Aug. 31, 1906		31,998 00	33,085 40
	Sept. 1, 1906	ounty	33,987 00	34,913 65
	Sept. 1, 1906		56,000 00	82,038 96
	Sept. 4, 1907		70,357 02	74,592 64
	Sept. 20, 1907		37,950 49	39,146 07
ng and				
	Aug 31, 1906	s (sections 4 and 5) road, No 441, Saratoga county	59,987 00	62,390 33
Co.	Sept. 20, 1907	-Schuylerville-Glens Falls road, No. 443, Saratoga	55,194 98	51,958 77
McNamee & Rice	July 10, 1906	Park road, No 453, Dutchess county	38,000 00	42,923 60
Ulysses G. Stockwell and Joseph Walker	July 9, 1906	Little Falls-East Creek road, No. 456, Herkimer county	31,263 00	30,307 08
Sylvester A Seymour	July 9, 1906	Little Falls-Herkimer road, No. 457, Herkimer county	55,950 00	59,400 25

TABLE OF CONTRACTS COMPLETED ON THE EASTERN DIVISION DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908 — (Continued).

Improvement of Public Highways — (Continued).

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Final payment.
John H. Nelson & Co	July 10, 1906	Herkimer Frankfort road, No. 458, Herkimer county	$31,367 00	$33,293 63
Clinton Beckwith Engineering and Contracting Co	July 9, 1906	East [illegible]), Herkimer county	56,000 00	56,201 90
John H. Nelson & Co	July 10, 1906	Herk[illegible] Herkimer county	62,425 93	82,504 61
Newport Construction Co	Oct. 27, 1907	Midd[illegible] erkimer county	71,255 59	67,395 81
Clinton Beckwith Engineering and Contracting Co	Aug. 31, 1906	[illegible]	44,649 00	52,279 75
Rockefeller Brothers	Nov. 18, 1907	[illegible]	43,370 90	48,929 46
P. A. Lillis	Nov. 26, 1907	[illegible] ty	25,370 58	26,958 23
P. A. Lillis	Nov. 26, 1907	[illegible]	24,106 02	24,424 66
Molloy & Murray	Oct. 16, 1907	[illegible] r county	80,393 40	85,852 35
Elmore & Hamilton Contracting Co	Sept. 5, 1907	[illegible]	38,646 16	35,324 35
Shanley Morrissey, Inc	Sept. 20, 1907	[illegible]	39,653 20	38,402 95
Shanley-Morrissey, Inc	Sept. 20, 1907	[illegible] ty	31,822 80	33,062 94
Jeremiah T. Finch	Sept. 19, 1907	[illegible]	52,305 45	54,111 94
General Construction Co	July 7, 1906	[illegible]	39,960 00	38,238 11
John W. Polcaro	July 6, 1906	[illegible]	19,200 00	21,319 44
Jeremiah T. Finch	Sept. 5, 1907	[illegible]	33,678 76	36,558 56
Twombly & Eldert	Jan. 27, 1908	[illegible]	47,555 56	52,552 21
John E. Consalus	Sept. 20, 1907	[illegible]	49,595 55	51,430 30
Morris Kantrowitz	Nov. 21, 1907	[illegible]	66,797 20	62,259 75
Lane Construction Co	Sept. 5, 1907	[illegible]	40,027 00	39,700 95
Samuel Beskin	Dec. 3, 1907	[illegible]	37,398 05	41,524 32
Joseph Walker	July 11, 1906	[illegible]	44,000 00	46,899 35
William F. McCabe	Nov. 26, 1907	[illegible]	36,775 38	39,924 03
Harry S. Williams	Sept. 1, 1906	[illegible]	24,987 00	25,482 70
County of Rockland	Sept. 13, 1906	[illegible]	105,585 00	144,167 28
General Construction Co	Dec. 3, 1907	[illegible]	12,776 54	14,213 67
John E. Consalus	Nov. 27, 1907	[illegible]	57,086 60	58,721 30
Hinman & Sproul	Sept. 5, 1907	[illegible]	53,188 15	54,796 55
Malloy & Davis	Sept. 18, 1907	[illegible] county	58,717 50	30,582 35
Malloy & Davis	Jan. 29, 1908	[illegible] county	33,545 50	35,511 04
Shanley Morrissey, Inc	Dec. 18, 1907	[illegible]	14,030 17	13,676 76

Jeremiah T. Finch	Dec. 4, 1907		55,750 00	55,929 98
Reardon & Byrne	Sept. 5, 1907		20,062 01	19,476 34
William F. McCabe	Nov. 26, 1907		71,087 98	71,017 61
John F Creeden	May 21, 1908		29,462 50	41,150 54
J. K. Palmer & Co	Nov. 27, 1907		17,038 40	17,665 93
S B. Van Wagenen	Dec. 4, 1907		24,577 01	24,811 99
Bellew & Merritt Co.	Jan. 30, 1908	ounty.	32,831 00	34,842 65
C. H. Flanigan	Jan 29, 1908		46,324 00	52,337 11
P. F. Herlihy	Jan. 30, 1908	unty.	76,102 00	85,547 03
Bellew & Merritt Co.	Jan. 30, 1908		29,502 50	33,970 60
Robertson Gerehart Contracting Co	Jan. 28, 1908		66,292 90	73,886 52
John F. Clancey.	Feb. 11, 1908	ounty	56,022 50	63,119 96
Bellew & Merritt Co.	Jan. 30, 1908	ounty.	44,939 00	43,132 25
Buckley Construction Co	Feb. 4, 1908		34,326 40	40,843 23
Spuyten Duyvil Construction Co.	Jan 27, 1908	county.	32,069 00	35,252 86
Linehan & Burnham	Feb. 5, 1908		35,350 00	46,337 30
Edward S Brower	Jan 29, 1908	y	24,455 25	25,607 04
Hinman & Sproul	Feb. 3, 1908	ounty	18,327 75	19,442 92
Bellew & Merritt Co	Jan 30, 1908		38,081 00	40,537 05
Buckley Construction Co	May 18, 1908		28,757 00	26,729 75
S B Van Wagenen	Sept. 30, 1908		9,002 00	8,865 00
Robertson Gerehart Contracting Co	Sept 22, 1908	Otego Village road, No. 782, Otsego county	4,001 61	4,343 90
Robertson Gerehart Contracting Co	Sept. 22, 1908	Milford Village road, No 783, Otsego county	6,483 26	6,547 67

TABLE OF CONTRACTS PENDING ON THE EASTERN DIVISION, SEPTEMBER 30, 1908.

Construction of Barge Canal.

Chapter 147, Laws of 1903, and amendatory laws

CONTRACTOR	Date of contract	Character of work.	Engineer's preliminary estimate.	Contract price, as affected by alterations.	Payments to September 30, 1908.
Empire Engineering Corporation	April 18, 1905	Contract No 1, Champlain canal — Hudson river, Northumberland to Fort Miller and Crocker's Reef to Fort Edward	$619,846 00	$607,420 82	$390,951 00
Ferguson Contracting Co.	April 3, 1905	Contract No 2, Erie canal — Through Waterford to Contract No 11	1,022,640 00	906,896 26	559,215 00
Sundstrom & Stratton	April 4, 1905	Contract No 3, Champlain canal — Fort Miller to Crocker's Reef	760,576 00	657,273 09	511,011 00
Groton Bridge Co.	Aug 10, 1906	*Contract No 7 Erie and Champlain canals — Bridges on contracts No 2 and 3	33,576 60	31,637 60	27,621 00
Pittsburg Eastern Co	May 22, 1906	Contract No. 8 Erie canal — Dams and locks at Scotia, Rotterdam and Cranesville	1,518,382 00	1,451,702 90	310,401 00
Fort Orange Construction Co	May 21, 1906	Contract No 11, Erie canal — From contract No 2 to Mohawk river	1,671,385 00	1,343,165 00	407,043 00
Acme Engineering & Contracting Co.	Sept 10, 1907	Contract No 14, F[illegible] k river, Crescent to Rexford Flat [illegible] at Crescent and Mindenville, dam [illegible] er's Ferry, Canajoharie, Yosts an[illegible]	2,875,570 00	2,947,838 00	334,413 00
Atlantic, Gulf & Pacific Co	Aug. 9, 1906	Contract No 15, Champlain canal — Whitehall to Comstock	1,380,760 00	1,523,819 75	621,306 00
United Construction Co.	Dec 20, 1906	Contract No 16, Erie and Champlain canals — Bridges on Contracts Nos. 11, 25 and 27	70,719 00	69,076 95	. .
The Scofield Co	Dec. 29, 1906	Contract No. 17, Erie canal — Dams and locks at Amsterdam and Tribes Hill	883,926 00	836,781 78	48,744 00
†Alexander Murdoch	Mar. 3, 1908		836,221 00	806,455 20	114,750 00
O'Brien & Hoolihan Contracting Co.	Dec. 28, 1906	Contract No. 18, Erie canal — Mindenville to Castle creek	785,980 00	855,001 90	260,028 00
Atlantic, Gulf & Pacific Co.	Nov. 19, 1906	Contract No 25, Champlain canal — Comstock to Dunhams Basin	1,849,831 00	1,717,649 50	366,813 00
Lake Erie Dredging Co.	April 6, 1908	Contract No 26, Champlain canal — Hudson river near Fort Edward	60,225 00	59,795 00	3,285 00

Kinser Construction Co.	Nov. 23, 1906	Contract No. 27, Champlain canal — Dunhams Basin to Fort Edward	998,920 00	968,296 11	227,835 00
Casey & Murray	Sept. 2, 1908	Contract No. 31, Erie canal — Through Little Falls; Rocky Rift dam	813,800 00	829,770 43	....
M. Fitzgerald	Aug. 8, 1906	Contract No. 34, Erie canal — Highway bridge at Saratoga avenue, Waterford	22,604 00	22,449 00	18,468 00

* Contract No. 7 includes work on Eastern, Middle and Western Divisions. † Contract relet.

TABLE OF CONTRACTS PENDING ON THE EASTERN DIVISION, SEPTEMBER 30, 1908 — (Continued).

Improvement of Public Highways.

Chapter 115, Laws of 1898, chapter 468, Laws of 1906, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1908.
Mansfield & Burton	Jan. 20, 1908	Craigville Under-grade crossing road, No. 154-B, Orange county	$15,592 00	$15,086 00	....
Robert Shafer	July 12, 1906	Lake Pleasant Speculator road, No 277, Hamilton county	33,900 00	24,443 40	$14,811 80
Shanley Morrissey, Inc	Sept. 30, 1907	Sprakers Rural Grove road, No. 304, Montgomery county	59,600 00	55,809 45	20,075 65
Shanley Morrissey, Inc	Dec 18, 1907	Canajoharie Sprout Brook road, No. 345, Montgomery county	41,900 00	38,610 70	17,932 05
Elmore & Hamilton Contracting Co	Dec. 2, 1907	Westpoint Cornwall road, No 411, Orange county	225,000 00	187,635 00	1,525 90
Morris Kantrowitz	Sept 19, 1907	Saratoga-Gansevoort road, No. 442, Saratoga county	45,700 00	37,611 50	19,204 70
Spuyten Duyvil Construction Co	Dec. 2, 1907	Old Forge McKeever road, No 462, Herkimer county	126,410 00	70,660 30	22,194 90
Shanley-Morrissey, Inc.	Jan. 30, 1908	Mayfield Northville (section 2), road, No 541, Fulton county	61,700 00	49,773 15	7,744 35
James E Martin	July 5, 1906	Poughkeepsie-Pleasant Valley road, No. 549, Dutchess county	66,450 00	52,496 00	55,845 04
Shanley Morrissey, Inc	Sept. 20, 1907	Carmel Kent road, No 570, Putnam county	69,842 11	51,925 50	35,088 05
J. K. Palmer & Co	Nov 27, 1907	Milford Center Milford road No. 674, Otsego county	77,927 30	70,050 38	36,502 85
J. K Palmer & Co	Nov. 27, 19[illegible]	[illegible] Otsego county	52,800 00	43,179 31	12,058 31
Delaware Construction Co	Feb. 4, 19[illegible]	[illegible] Kelsey Corner road, No [illegible]	43,900 00	42,815 39	17,120 85
Spuyten Duyvil Construction Co	Jan. 27, 19[illegible]	[illegible] No. 702, Franklin county	53,900 00	43,229 00	8,935 20
John E Consalus	Feb. 11, 19[illegible]	[illegible] 2) road, No. 719, Greene [illegible]	55,100 00	37,894 90	21,157 60
P. F Herlihy	May 18, 19[illegible]	[illegible] No. 745, Essex county	60,200 00	43,660 95	1,465 25
Santoroni Construction Co.	May 18, 19[illegible]	[illegible] n 2) road, No. 756, Essex [illegible]	91,400 00	61,044 00	29,209 50

REPORT

OF THE

DIVISION ENGINEER

OF THE

MIDDLE DIVISION

For the Fiscal Year Ended September 30, 1908

MIDDLE DIVISION.

State of New York,
Department of State Engineer and Surveyor,
Middle Division.

Syracuse, N. Y., *October* 1, 1908.

Hon. Frederick Skene, *State Engineer and Surveyor, Albany, N. Y.:*

Sir.— I have the honor to transmit herewith the annual report of the Middle Division of your Department for the fiscal year ended September 30, 1908.

There have been no changes in the existing canal system and no interruptions to navigation during the season, except that on the first level of the Oswego canal following the failure of the counterweight on the North Salina street bridge.

The engineering duties of the force on this division has comprised the supervision of work under special appropriations on the existing canals, the construction of the Barge canal and the construction and maintenance of improved highways.

Under special appropriations there have been completed the repairs to the Montezuma turnpike bridge and the construction of a new aqueduct under the Erie canal at Durhamville; and there remains under contract and in progress the construction of stairways to the Catharine street bridge, the new lift bridge over the Oswego canal at North Salina street, both in the city of Syracuse, and the construction of a protection wall at Skaneateles lake outlet.

I would strongly recommend at this time that the canal blue line be carefully surveyed and monumented. We have had several cases of very serious trouble during the past few years, due to the lack of notes and data on this point. And as many farm lot descriptions start from the canal it would be unwise to abandon

the old canal without first carefully monumenting at least the most important points, so that the blue line may be easily picked up.

The details of contracts completed and in force on the Barge and existing canals are herewith appended.

CONTRACTS COMPLETED DURING FISCAL YEAR ENDED SEPTEMBER 30, 1908.

REPAIRING THE MONTEZUMA TURNPIKE BRIDGE OVER THE SENECA RIVER, SENECA COUNTY.

(Chapter 575, Laws of 1907.)

Contractors, Henry Tosh & Son.

Engineer in charge, Edward M. Ellis.

Appropriation	$2,500 00
Engineer's estimate	1,900 00
Contract price	1,786 00
Final account	1,716 25

The Montezuma turnpike bridge over the Seneca river is in the vicinity of what is called "Montezuma Marshes" and the territory is covered with flags which dry out in the fall and are very inflammable. The railroad crosses the marshes a short distance from the turnpike and, presumably, sparks from the engines set the flags afire. The flames spread to the vicinity of the bridge, burning several of the piles and stringers of the structure. This contract was for repairing the portion damaged by fire.

CONSTRUCTING A NEW AQUEDUCT UNDER THE ERIE CANAL AT DURHAMVILLE.

(Chapter 672, Laws of 1906.)

Contractor, Theo. F. Kalbfleisch.

Engineer in charge, David R. Lee.

Appropriation	$76,600 00
Engineer's estimate	46,455 00
Contract price	56,093 00
Final account	52,327 97

The old aqueduct under the Erie canal at Durhamville had an area, or cross-section, too small to carry the water coming down

Barge Canal, Contract No. 4.
View at Sylvan Beach, showing forms for concrete bridge approach.

Oneida creek in times of heavy rains. The water backed up after each heavy rain, doing considerable damage.

The new structure has nearly twice the capacity of the old one and should meet the conditions and successfully carry the flow.

Much difficulty was encountered by the contractor in carrying on the work of this contract, due to high water; and during one freshet his site of operation was flooded and the machinery covered by water, necessitating delays until coffer-dams could be reconstructed and pumped out. However, the contract was carried to satisfactory completion in time for spring navigation.

Much credit is due the contractor, Theo. F. Kalbfleisch, for the persevering manner in which he carried on the work under very discouraging conditions.

CONTRACTS PENDING SEPTEMBER 30, 1908.

CONSTRUCTING STAIRWAYS FOR THE LIFT BRIDGE AT CATHARINE STREET, SYRACUSE.

(Chapter 683, Laws of 1906.)

Contractor, National Construction Company.

Engineer in charge, Edward M. Ellis.

Engineer's estimate	$1,065 50
Contract price	1,500 00
Payments to September 30, 1908	675 00

This contract called for constructing a stairway for the lift bridge over the Erie canal at Syracuse, that part being omitted from the contract for the bridge construction.

The matter was delayed for some time, owing to the inability of the contractor to obtain material, but was finally completed this season.

CONSTRUCTING A LIFT BRIDGE OVER THE OSWEGO CANAL AT NORTH SALINA STREET, SYRACUSE.

(Chapter 668, Laws of 1906.)

Contractor, John M. Shultz.

Engineers in charge, D. C. Wedgeworth and Edward M. Ellis.

Engineer's estimate	$62,621 00

Contract price	$65,686 00
Payments to September 30, 1908..................	60,228 00

This contract calls for removing the existing structure, making all necessary excavations and building a new substructure, building new superstructure, grading and repaving the approaches.

This structure has gained considerable notoriety, due to the fact that it is built with the greatest skew of any Bascule bridge, viz., 56 degrees; also to the fact that a concrete counterweight was used and the skew necessitated a very careful working out of the dimensions for same. The construction proceeded successfully and was completed for the opening of navigation, but a few days after, for some reason never satisfactorily explained, the counterweight sheared off and stopped all operation as far as navigation was concerned on the Oswego canal.

The cause of failure, as advanced by many, was that insufficient time was allowed for the concrete to set and in the hurry to open the canal for navigation an error was made. However, the contractor at once proceeded to repair the damage and all old material was removed and the entire counterweight, weighing over three hundred tons, was reconstructed.

The engineers in charge of this work, Mr. D. C. Wedgeworth, and later Mr. Edward M. Ellis, deserve commendation for the manner in which they performed their duties and have received much praise, to which they are justly entitled.

CONSTRUCTING A PROTECTION WALL ON THE WEST SIDE OF SKANEATELES LAKE OUTLET.

(Chapter 675, Laws of 1906; chapter 400, Laws of 1907; chapter 394, Laws of 1908.)

Contractors, John Young and Patrick J. Cawley.

Engineer in charge, David R. Lee.

Engineer's estimate	$9,122 00
Contract price	11,893 00
Payments to September 30, 1908.................	Nothing

BARGE CANAL, CONTRACT NO. 4.
View from Sylvan Beach bridge, showing piers for concrete approach.

The contract called for constructing a sea wall along the west side of Skaneateles lake outlet.

This work has been under consideration for several years but heretofore no bid was received inside the appropriation. Some changes were made in the general construction, the work readvertised and the contract let to John Young and Patrick J. Cawley. The contractors were at work soon after the contract was awarded, and being favored with low water and fine weather they have carried the work nearly to completion and will unquestionably entirely finish the contract before January 1, 1909.

BARGE CANAL CONTRACT NO. 4, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractor, Empire Engineering Corporation.

Engineer in charge, Edward J. Berry.

Engineer's estimate	$812,560 00
Contract price	726,815 00
Payments to September 30, 1908	360,252 00

This contract consists of the excavation of the canal and the protection of its banks, from station 6715 to the end of the breakwater in Oneida lake at Sylvan Beach, station 6970; length, 4.83 miles; the construction of foundations and abutments for Burdick's bridge, station 6773, Roberts' bridge, station 6887, the N. Y. O. & W. R. R. bridge, station 6901, and the Sylvan Beach bridge, station 6939, together with their approaches; the construction of Drum creek entrance and other creek intersections; the construction of the crib and pile docking at Sylvan Beach, and the breakwater and guard pier in Oneida lake and work incidental thereto.

This contract was awarded to Lindon W. Bates, who assigned it to the Empire Engineering Corporation. Construction work was started in September, 1905, but progress was extremely slow. However, during the past year better results were obtained and the work is now progressing satisfactorily.

BARGE CANAL CONTRACT NO. 5, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractor, Empire Engineering Corporation.

Engineer in charge, G. W. Stickney.

Engineer's estimate	$421,252 50
Contract price	381,987 50
Payments to September 30, 1908	113,238 00

This contract consists of the excavation of the canal and the protection of its banks from station 5074, near Mosquito Point bridge over the Seneca river, to station 5373, east of the village of Savannah, length, 5.66 miles; the construction of Owasco creek extension; construction of abutments and piers for the bridges at Mosquito Point, Sibley's and Fox Ridge highway crossing, and all work incidental thereto. This contract was awarded to Lindon W. Bates in April, 1905, and afterward assigned to the Empire Engineering Corporation.

Work was stopped early last spring, owing to the fact that the 1906 Legislature passed a bill changing the line of the canal west of station 5202, from which point it now takes a southerly course following the general course of Seneca river to May's Point. This work, from station 5202 west, is now embodied in Contract No. 45.

BARGE CANAL CONTRACT NO. 7 — BRIDGES ON SECTIONS 5 AND 7, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractor, The Groton Bridge Company.

Engineers in charge, Edward J. Berry and G. W. Stickney.

Engineer's estimate	$39,883 30
Contract price	38,125 80
Payments to September 30, 1908	25,353 00

This contract is for the steel work furnished and erected in place for bridge and superstructures on Contracts Nos. 2, 3, 4, 5 and 6, but only Contracts Nos. 4 and 5 are in the Middle Division,

Barge Canal, Contract No. 12.
Hydraulic dredge at work in the Oneida river.

and the work on these includes Burdick's, Roberts' and Sylvan Beach bridges on Contract No. 4, and Mosquito Point bridge on Contract No. 5.

This contract was awarded to the Groton Bridge Company in August, 1906, but actual work was not commenced until last spring. The contractor has completed Mosquito Point bridge, Sylvan Beach bridge, Roberts' road, and about the first of the year will have Burdick's bridge finished, completing the work on the division.

BARGE CANAL CONTRACT NO. 10, OSWEGO CANAL.

(Chapter 147, Laws of 1903.)

Contractors, Mosier and Summers.

Engineer in charge, George C. Andrews.

Engineer's estimate	$1,149,988 00
Contract price	1,126,718 00
Payments to September 30, 1908	176,706 00

This contract consists of excavating the canal and protecting its sides, constructing locks Nos. 2 and 3, the dams, bulkheads and other incidental details between 0.35 mile above the Broadway bridge and 0.28 mile below the Oneida street bridge at Fulton. Length of contract, 1.2 miles.

This contract was awarded to Mosier and Summers June 7, 1906, and the work was very unsatisfactory until last spring, when, under new management, better progress was made.

Previous to October 1, 1907, payments amounted to only $67,-104. During the past year, or to October 1, 1908, $109,602 has been paid, making a total payment to October 1, 1908, of $176,-706, showing better progress but not what should be accomplished as time expires June 7, 1909, and only 15 per cent of the work is completed.

BARGE CANAL CONTRACT NO. 12, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractor, Stewart-Kerbaugh-Shanley Company.

Engineers in charge, A. G. Crysler and N. R. McLoud.

Engineer's estimate	$3,082,560 00

Contract price	$3,391,716 00
Payments to September 30, 1908	234,036 00

This contract includes the excavation of the canal and protecting of its sides, constructing lock No. 23 and appertaining structures, abutments and bridge approaches, bridges and other incidental details between deep water in Oneida lake, at its western end, and Mosquito Point bridge over the Seneca river, or from station 2720 to station 5074. The length of this contract is 43.73 miles.

This contract was awarded to the Stewart-Kerbaugh-Shanley Company in September, 1907, and construction started in April, 1908.

The work is progressing in a most satisfactory manner. The contract has been equipped with a plant thoroughly and intelligently, with the result that the progress is all that can be desired, and there is every indication that the work will be completed within the specified time.

BARGE CANAL CONTRACT NO. 35, OSWEGO CANAL.

(Chapter 147, Laws of 1903.)

Contractor, Gilmour-Horton-Allen Company.

Engineer in charge, Geo. H. Haley.

Engineer's estimate	$752,760 00
Contract price	739,261 00
Payments to September 30, 1908	43,128 00

This contract consists of excavating the canal and protecting the sides, constructing locks Nos. 7 and 8, bulkheads, culverts, spillways and incidental work between 0.56 mile above Utica street bridge and the harbor line north of Bridge street bridge at Oswego. Length of contract, 0.85 mile.

The contract was awarded to the Gilmour-Horton-Allen Company in September, 1907, and work commenced about January 1, 1908. Progress has been slow, due in part, perhaps, to the failure of coffer-dams, which caused a long delay. Indications are that the work will now progress more satisfactorily.

BARGE CANAL, CONTRACT NO. 12.
Raising and rebuilding highway bridge at Brewerton.

BARGE CANAL, CONTRACT NO. 12.
View showing progress in constructing a bridge at Oak Orchard.

BARGE CANAL CONTRACT No. 45, ERIE CANAL.

(Chapter 147, Laws of 1903.)

Contractors, Scott Brothers.

Engineer in charge, D. C. Wedgeworth.

Engineer's estimate	$425,124 00
Contract price	467,513 50
Payments to September 30, 1908...............	42,741 00

This contract consists of constructing a dam in the Oneida river at Caughdenoy and lock No. 24 and appertaining structures at Baldwinsville. Length of contract, 0.55 mile.

The contract was awarded to Scott Brothers in May, 1908, and work was started in June, 1908. The contractors have been very progressive and pushed the work in a business-like manner. Most of the buildings on the line have been removed; 80 per cent of the prism excavation from the river to Syracuse street is completed; the foundations for the Syracuse street bridge are excavated and the concrete work is well along.

At Caughdenoy dam the work is well under way. There is every indication that the contractors will complete their work within the time specified.

BARGE CANAL.

(Chapter 147, Laws of 1903.)

The Middle Division is divided into residencies Nos. 5, 6 and 7 on the Erie canal; residencies Nos. 1 and 2 on the Oswego canal, and Water-Supply residency.

Erie canal residency No. 5 extends from the east line to the west line of Oneida county with headquarters at Rome, Fred J. Wagner, Resident Engineer, in charge. Contract No. 4 is within this residency, the office for same being at Sylvan Beach, with Edward J. Berry in charge.

Erie canal residency No. 6 extends from the west line of Oneida county to the west line of the village of Baldwinsville. Erie canal residency No. 7 extends from the west line of the village of Baldwinsville to the west line of the village of Savannah. Residencies Nos. 6 and 7 are combined, with Guy Moulton, Resident Engineer,

in charge. These residencies embrace Contracts Nos. 5, 12 and 45. The branch offices for Contract No. 12 are at Brewerton and Baldwinsville, A. G. Crysler, Assistant Engineer, in charge of the former, and N. Ross McLoud, Leveler, in charge of the latter. The branch office for Contract No. 45 is at Baldwinsville, D. C. Wedgeworth, Assistant Engineer, in charge. The branch office at Fox Ridge for Contract No. 5 was abandoned early in the spring of 1908, as the work was stopped on this contract.

The Oswego canal residencies have not as yet been definitely divided. Previous to November 1, 1907, the Oswego canal was all under one residency, but with the increase in the work it was necessary to divide it.

Residency No. 1 has headquarters at Fulton with T. M. Ripley, Resident Engineer, in charge. Residency No. 2 has headquarters at Oswego, with Edwin Styring, Resident Engineer, in charge.

The Water-Supply residency is under the direction of Russell R. Stuart, Engineer of Water-Supply, at Syracuse, and a branch office at Rome.

The Barge canal work on the Middle Division during the past year, while not entirely satisfactory, has shown marked progress. Up to October 1, 1907, payments had been made to contractors to the sum of $317,258, as a total for all work done since the beginning of the project. During the past year payments amounting to $678,196 have been made, or over twice as much, and the total of payments to October 1, 1908, reaches nearly $1,000,000.

During the past year seven contracts were under construction, viz., Nos. 4, 5, 7, 10, 12, 35 and 45, and by spring four more will be added, viz., No. 46, dredging contract, extending from the end of Contract No. 5, west; No. 55, Delta dam; No. 50, dam at Hinckley, and No. 57, Syracuse harbor. Plans have also been completed for Contract No. 42, which includes prism excavation, construction of lock No. 20, stream entrances, spillways, bridge and other structures between the Herkimer-Oneida county line and Oriskany; also for Contract No. 43, which includes prism excavation between Oriskany and Contract No. 4 with appurtenant structures, stream entrances, etc. Plans are under way and will soon be completed for Contract No. 51, which includes the con-

BARGE CANAL, CONTRACT No. 12.
Pile foundation for a bridge abutment about two miles east of Three River Point.

BARGE CANAL, CONTRACT No. 12.
Building bridge abutment about two miles east of Three River Point.

struction of a diverting dam and a feeder to Nine-Mile creek watershed. The progress of preparing plans on the Barge canal at Oswego has been slow, owing to claims for damages along the Oswego river by power owners. The result of these cases will govern final decisions on plans.

The reports of the Resident Engineers of the several residencies follow:

ERIE CANAL, RESIDENCY NO. 5.

Resident Engineer Fred J. Wagner reports:

"Residency No. 5, extending from the Herkimer-Oneida county line, on the east, to the Oneida-Oswego county line, on the west, includes Contracts Nos. 42, 43 and 4.

"*Contract No.* 42 covers the territory between the Oneida-Herkimer county line and Oriskany. Plans were submitted last year for this contract, the location being through the new river channel excavated by the city of Utica, but upon further investigation these plans were withdrawn and the survey has been completed and plans are being prepared for this contract, providing for building the canal about 500 feet north of the above-named new river channel, thereby saving a large sum of money.

"*Contract No.* 43 extends from the west end of No. 42, at Oriskany, to the east end of Contract No. 4, a distance of practically 17 miles. After a large amount of study, the State Engineer and the Advisory Board of Consulting Engineers have agreed that a line known as the Rome swamp line, with a water-surface elevation of 420.0, is the cheapest and best line of the various ones under consideration; therefore, during the past year this line has been surveyed and plans are nearly completed for what is known as the Rome summit level.

"*Contract No.* 4. The work on this contract, for which the Empire Engineering Corporation of New York city has the contract, has progressed fairly well during the past year and 55 per cent of the total work under this contract is completed, 32 per cent having been done during the past year. One more season will complete the contract."

ERIE CANAL, RESIDENCY No. 6.

Resident Engineer Guy Moulton reports:

"Section No. 6 extends from deep water in Oneida lake to Baldwinsville, a distance by the Barge canal route of 23.4 miles. This is covered by Contracts Nos. 12 and 45. Contract 12 also covers that portion of Section 7 between Baldwinsville and Mosquito Point, about 20.5 miles.

"*Contract No.* 12 was awarded to the Stewart-Kerbaugh-Shanley Company September 23, 1907. Work was started at Brewerton in April and at State Ditch in May, 1908, by steam-shovel. During the season of 1908 a plant has been assembled on this contract, consisting of two steam-shovel outfits, one 20-inch hydraulic dredge, two ladder, or bucket dredges, and a combination Lidgerwood and Page bucket machine, with the necessary tugs, scows, etc. No work has been done by the two ladder dredges. A good start on the contract has been made and 8.4 per cent of the total work has been completed.

"*Contract No.* 45 is for the construction of a lock, with its approaches, bridges, etc., at Baldwinsville, and a dam across the Oneida river at Caughdenoy. The contract was awarded May 6, 1908, to Scott Bros. Work was started in June. Most of the buildings through the village of Baldwinsville have been removed, and about two-thirds of the prism excavated east of Syracuse street to the river. The foundations for Syracuse street bridge abutments have been excavated and the concrete work started. At Caughdenoy the foundation for about 100 linear feet of the dam and apron has been excavated and the concrete placed to the top of the apron, elevation 364.

"*Syracuse harbor.* This, with the entrance thereto, will extend from Seneca river to Onondaga lake, across the lake and thence across the salt lands to the vicinity of Spencer street in Syracuse. The distance on which actual work will be done will be about two miles. Plans for this work are nearly completed."

ERIE CANAL, RESIDENCY No. 7.

Resident Engineer Guy Moulton reports:

"Section No. 7 extends from Baldwinsville to Wayne county line, a distance by the Barge canal route of 32.7 miles, and includes Contracts Nos. 5, 7 and 46.

Barge Canal, Contract No. 7.
Completed bridge at Mosquito Point; one span over canal channel and three spans over Seneca river channel.

"*Contract No.* 5 is located in this section and extends from Mosquito Point to station 5202 + of the revised line. During the fall of 1907 the north abutment of Howland Island bridge was completed, as were the approaches to the Mosquito Point bridge. Owing to hardness of the material but little prism excavation was done. In the spring of 1908 the entire plant was removed from the site of the contract and taken to Sylvan Beach — Contract No. 4.

"*Contract No.* 7 is for the superstructures of the bridge at Mosquito Point. The erection of this bridge has been completed.

"The balance of this section, from station 5202 + to Wayne county line, a distance of 9.44 miles, constitutes Contract No. 46. Plans for this contract have been gotten out and the work is ready for letting."

OSWEGO CANAL, RESIDENCY No. 1.

Resident Engineer T. M. Ripley reports:

"*Field work.* In securing data relative to spoil bank area and land which may be flooded, there have been made 4½ square miles of topographic surveys (contour interval 2 feet), chargeable to Contract No. 39; also cross-sections taken of the present tow-path from Phœnix to Fulton, a distance of 9¾ miles. In order to determine the practicability of diverting the waters and discharging them into the Oswego river via Tannery creek, north of Fulton, a survey was made 8 miles long and covering about 5 square miles of territory. This scheme was mapped and preliminary designs and estimates made. By order of the Court of Claims, surveys were made to reëstablish the line of Steen's location (now part of Fulton), the results of this survey to be presented to the court as matters in fact in the suit of the Fulton Light, Heat & Power Company *vs.* The State of New York. The base line has been resurveyed and restored for a distance of 19 miles, and 7½ miles thereof marked with concrete monuments. Four locations of proposed dams have been surveyed and 278 test holes, amounting to 2,275 linear feet, put down for determining character of subsurface and materials.

"*Contract No.* 10. During the latter part of the year 1907 work progressed only on the north end of the contract and in

October concrete work was done in building the extreme north end of the river wall. This is the wall west of the prism, provided for the purpose of keeping the river from flowing into the canal in high-water time, the river at this point being a rapids, and the water on the rapids being on a higher elevation than it will be in the prism after the canal is completed. This concreting was carried on intermittently as construction conditions and weather permitted until about the first of January, 1908. In February, 1908, the Superintendent of Public Works called upon the contractors to show cause why the contract should not be taken from them and relet. After this matter was adjusted, high water was upon us and flooded the works at the north end, so that work was not resumed until the first of April.

"Prior to the opening of the canal, which was delayed until about June 1, 1908, bulkhead No. 1, for supplying water to the hydraulic race at the east end of the lower dam, was completed and several hundred yards of concrete laid in the retaining wall on the east side of the forebay above this bulkhead. As soon as the work at the north end of the contract could be unwatered, work was resumed and excavation progressed until the end of September, 1908. This included not only excavation in the prism but also the larger part of the tail-race for the mills adjacent to the work. Practically all of the excavation was red sandstone, which lies in unsymmetrical strata and is very difficult to break up for economical handling. The tail-race joins the prism about 900 feet north of the Oneida street bridge. Between these two excavations, there is left a long narrow tongue of rock, and under the original plans it was shown that this rock was to be removed by blasting to a ten-on-one slope and on the top of this rock, between the prism and the tail-race, was to be built a concrete wall to six feet above pool-level. Owing to the rock stratification it was impossible to remove this rock by blasting, where the tail-race and prism excavation joined, to the slope shown on the plans. This necessitated carrying the said concrete wall for a distance of about 100 feet around the nose, and south along the prism, to grade. As soon as this wall was constructed, the docking wall along the west side of the prism built to station 656 + and the prism excavation to the north completed, a strong A-frame dam was placed across the

Barge Canal, Contract No. 10.
View showing construction of wash-wall.

prism between these walls and the mills, which had been without water-power for some time, were allowed to operate by discharging into the new tail-race. This coffer-dam has been a complete success and work has progressed behind and to the south of it during the entire past summer. Most of the excavation at this point during the past summer has been made with a 70-ton Bucyrus shovel, although the larger rocks and a small portion along the west side of the prism have been handled by derricks.

"Previous to the final flooding of the northern end of the contract, wash-wall was laid on both sides of the prism and the mouth of the old Hunter tail-race protected by paving. The excavated material which was removed by the derricks was placed in the dyke, which extends northerly from the river wall to and across Grass island, a distance of about 2,000 feet. The westerly side of this dyke, namely the river side, was riprapped from the wall to the island.

"Under Alteration No. 1 for Contract No. 10, there was eliminated from the contract a considerable amount of work adjacent to the factory of the Oswego Falls P. & P. Company. This work was for the purpose of taking care of the forebay of the power-plant of the said company. This company being desirous of changing the plans agreed with the State to do all of the work adjacent to their forebay at their own expense. Operations for this work were started in July by Mosier and Summers on behalf of the Oswego Falls P. & P. Company and up to September 30 there had been done about $20,000 worth of work. In a fair estimate of the progress of the work on this contract, I think it but just to the contractors to recognize their work for this company. The total of all work done during year is 10.9 per cent of estimated cost, and the total of all work done to date is 17.1 per cent of estimated cost."

OSWEGO CANAL, RESIDENCY NO. 2.

Resident Engineer Edwin Styring reports:

"The limits of this residency have not been fixed, but it includes Contract No. 35, at Oswego, and parts of Contracts Nos. 37 and 39, extending south from Oswego to Minetto. Contracts Nos. 37 and 39 have not yet been let and no field or office work has been

done on them from this residency, except that necessary for monumenting the base line from Minetto to Oswego. The base line between these places is now marked by a substantial concrete monument at every angle point. The main work of the residency for the year has been the engineering on Contract No. 35, through Oswego. Work on the contract was commenced in October, 1907, and has progressed since then through varying stages of success with the net result that at the end of a year's time 6.4 per cent of the contract is completed. The contractors have had poor success with their coffer-dams and their failure on several occasions has caused months of delay. The several branches of work on the contract carried on during the year and their extent are about as follows:

" The 200-foot steel bridge at Utica street over the canal is completed, with the exception of wooden block pavement over it. Lock No. 8 and its approach walls have a good start and work on them will be pushed until the severe weather of the winter comes. Part of the river wall north from Utica street is laid, and the buildings on First street near Hubbard street have been raised.

" The major part of the contractors' operations during the year has been work that does not show up in the estimates or figures on percentage of work done. Coffer-dam work and the building of plant have occupied most of their time and expenditures. Fully seven-tenths of a mile of coffer-dams have been built, parts of it, owing to failures, having to be built a second time. High water in the river and lake during the winter and spring helped to delay the work on the dams. Part of the work of the year was the building of a stone-crushing and concrete-mixing plant. Track-laying and erection of plant have taken up a portion of the time consumed."

BUREAU OF WATER-SUPPLY.

Engineer of Water-Supply, Russell R. Stuart, reports:

" In general, the work of this bureau for the past year has been confined to surveys, studies, contract plans and estimates for Contracts Nos. 55, 50 and 51, also preliminary surveys and borings for Contract No. 58. These will be taken in order, with a statement of the work done on them during the fiscal year:

" *Contract No. 55, Delta Dam and Reservoir.* Contract plans

Barge Canal, Contract No. 10.
View of one of the bulkheads required for water-power plants in Fulton.

(which were under way at the beginning of the year), estimates and specifications have been completed. The contract was advertised to be let October 1. The flow line was located and surveyed around the reservoir (about 12 miles in length); the right-of-way line (about 15 miles in length) was located and surveyed. Appropriation surveys and maps of lands to be appropriated have been in progress. In all, 44 parcels of land, containing 954 acres have been surveyed and mapped. Field work has been finished on 50 other parcels. Miscellaneous field work in connection with making the contract plans and estimates were completed.

"*Contract No. 50, Hinckley Dam and Reservoir.* Studies, detail plans and tracings for Contract No. 50 have been in progress. Plans and tracings are now nearly completed and computations for the contract estimate are under way. A stadia survey of that portion of the reservoir above Grant (which was omitted in the original survey) was made, including everything below the 1,233 contour. Topographic maps of this section (scale 1 inch=200 feet) were made. About 15 miles of the appropriation line and flow line have been located and surveyed; clearing has been estimated and the bridges surveyed. Preliminary surveys for the proposed relocation of 15 sections of highway, of a total length of approximately 8 miles, have been made and estimates practically finished. The wash-drill party was engaged at the dam site the beginning of the year and finished drilling in October, 1907; total number of feet drilled, 552. A test-pit party was started in November, 1907, and continued the major portion of the time up to September, 1908. Samples of the material from test pits were screened to determine the percentage retained, etc. The results of the test pits demonstrated that sufficient suitable material to build the embankment portion of Hinckley dam is available in the immediate vicinity of the site.

"*Contract No. 51, West Canada Creek Feeder and Diverting Dam at Trenton Falls.* Surveys were made of the proposed dam site. A preliminary center line for the feeder was run and cross-sectioned from Trenton Falls to the Nine-Mile creek, a short distance below South Trenton (abont 6 miles in length); additional topography was taken for proposed changes in the feeder line and comparative estimates made on the several different lines. Wash-

drill borings and rod soundings were taken at the proposed site of the diverting dam, at the proposed crossing of the Cincinnatus creek and along the proposed center line of the feeder. These borings and rod soundings are now nearing completion. In all 1,213 feet of wash drilling, and 179 feet of rod soundings were done. Preliminary studies and detail plans were made for the diverting dam, gate-house for the syphon, and other necessary structures on the line of the feeder. Plans and estimates for this contract are in progress. Plans will soon be ready for tracing.

"*Contract No. 58, High Bridge Dam and Reservoir.* Bore holes were laid out and cross-sections taken at the proposed dam site. The boring party began work at the site in October, 1907, and stopped work there in January, 1908; total number of feet bored with wash drill, 514. The purpose of the borings was to determine the best location for the dam. The borings in the bottom of the valley showed rock a comparatively short distance below the surface of the ground. Borings at the north end of the dam did not reach rock on account of the extremely difficult character of the work. Borings at this point extended about 80 feet below the surface of the ground and showed the material to this depth to be largely composed of coarse gravel and boulders — mostly boulders. The completion of this work was postponed indefinitely, for the reason that, owing to revisions in the estimates of the amount of water required for the summit level of the Barge canal and the amount of water available from the other reservoirs, it did not seem probable that this reservoir would be required."

IMPROVEMENT OF PUBLIC HIGHWAYS.

(Chapter 115, Laws of 1898, and amendatory acts.)

The volume of work done on the improvement of public highways during the past year on this division exceeds by far that accomplished during any preceding year. During the year 1907, some 90 miles of macadam were laid on 45 separate contracts, this being the largest amount laid in any year up to that time. During the past fiscal year, ended September 30, 1908, some 188 miles of macadam were laid on 77 separate contracts, scattered over twelve of the fourteen counties comprising the Middle Division.

BARGE CANAL, CONTRACT No. 10.
View showing progress in constructing head-gates for power plant in upper part of Fulton.

There were 21 contracts, covering 95 miles, awarded during the year. At the opening of the season, in the spring of 1908, there were 78 contracts in force, which provided for 308 miles of highway improvement. At the end of the fiscal season, September 30, there were only 13 of these contracts completed and accepted, but a large percentage of the balance were nearing completion, and at the present writing, November 15, there remain but 38 miles of macadam to be laid on 18 contracts. At the beginning of the season of 1908, there were 63 miles of macadam laid on the contracts then in force, which indicates that 207 miles of macadam were laid during the working season of 1908.

All the roads which have been improved in this division, with but two exceptions, have been provided with a macadam surface generally six inches in thickness, varying from 10 feet to 16 feet in width.

The Fulton–Volney road, No. 539, in Oswego county, was surfaced with gravel 9 inches in depth, the gravel being passed through a rotary screen, which separated in into four sizes, the screen having perforations of the following dimensions: ¾ inch, 1¼, 2½ and 4 inches. The bottom course was formed of the 2½-inch to 4-inch product, laid 5 inches in depth when rolled in place, and 12 feet in width, and filled with the product passing through the ¾-inch screen. The top course for 12 feet in width and 4 inches in depth was formed of the product passing over the 1¼-inch screen and falling through the 2½-inch screen, which, after being rolled in place, was filled with the product passing through the ¾-inch screen and puddled as required for macadam. The product passing over the ¾-inch screen and falling through the 1¼-inch screen was used to form the shoulder, or wings, for 4 feet in width on each side of the 12-foot section, giving a gravel surface, when completed, 20 feet in width. The road apparently is giving very good satisfaction, and where a good grade of gravel can be obtained and the road to be improved has medium to light traffic, this method of construction is recommended.

On that section of the Utica–Oneida Castle road, No. 250, extending from the Utica city line to the corporation line of the village of New Hartford, the abutting property owners are incorporated in two separate road districts, whereby they are authorized

to vote appropriations and levy and collect the same for highway purposes only. A committee from these districts petitioned the State Engineer to provide for a better class of pavement than the plans called for between the city line of Utica and the corporation line of the village of New Hartford, a distance of 1.2 miles, setting forth in the petition that they would provide for the additional expense of an asphalt pavement over and above the cost of the ordinary macadam. The plans were therefore revised for this section of road, providing for an asphalt surface on a concrete base for a width of 23 feet, together with concrete curbs and gutters and other accessories. The additional cost of such construction over a macadam road 20 feet in width was estimated at $28,200, which sum was made available and subject to the draft of the State Engineer and Surveyor. The road was therefore improved on this basis: From Utica to New Hartford, 1.2 miles, it has an asphalt surface 23 feet in width; from New Hartford to Lairdsville, 5.11 miles, a macadam surface 16 feet in width.

The weather conditions of the past season have been very favorable for contractors, no doubt increasing the mileage of macadam laid over that which might have been accomplished in an ordinary season by 20 per cent and consequently increasing the profit to the contractor. Doubtless this will result in lower proposals being received for next season's work, with subsequent disappointment to the contractors.

While the dry weather was favorable to construction work, it was very severe on the completed roads which were under traffic. The surface became dry and brittle; the finer particles of stone, loosening up and lying on the surface, were ground into dust and blown away, exposing the larger fragments; in many instances the top course to its entire depth began to loosen up. To remedy this and prevent further raveling, about three-quarters of a cubic yard of sand, fine gravel and crushed stone screenings, or the so-called ¾-inch product, were spread along the center six feet of each 100 feet in length of road and this covering, under the traffic, restored the cushion and prevented further raveling and gradually improved the general condition of the surface. If care is taken not to apply more than three-quarters of a cubic yard per 100 feet in length of road, there will not be excessive dust resulting from the

Barge Canal, Contract No. 10.
View at the lower end of the lower approach to lock No. 3, at Fulton. A coffer-dam is seen, built between approach walls.

grinding of this covering under traffic and, from an economic point of view, this would appear to be the most desirable method of treating the surface of macadam roads which cannot be sprinkled daily during the dry season.

The treatment of the surface of old macadam roads with crude petroleum oil having an asphaltic base has been used on but one road in this division and the results obtained would not warrant the recommendation of this method of preserving the macadam surface.

The Thompson road, No. 429, has a limestone macadam surface and is subjected to heavy automobile and light wagon traffic. The surface soon became very rough and the stone was about ready to ravel, when the surface was coated with a preparation of tar, commercially known as " Vitovia," applied cold and covered with as much of the " buckwheat " product of crushed syenite as the tar would take up. This application was made early in the season and the surface has since been very satisfactory, but this method can be considered only a palliative treatment and the excessive cost would seem to be prohibitive.

Observation of macadam surface which has been treated in this manner would indicate that any thin cushion which is built up on top of the old hard surface will soon be ground up and worn away by heavy wagon traffic. The condition can be compared to beating out a thin piece of metal between a hammer and anvil. It would therefore seem that the only practical method of using tar preparations in connection with macadam would be to mix the tar with the stone, either by hand or machinery, in forming the entire top course of macadam when the road is constructed. The crushed stone used should not be screened, except to remove the tailings, and a percentage of sand should be added (about 15 per cent), to reduce the amount of voids and thereby reduce the amount of tar required to thoroughly fill the remaining voids and make the surface impervious to water. An excess of tar will make the macadam soft in warm weather. A top course of macadam 2½ inches in thickness when rolled in place, built in this manner, if laid on a macadam or Telford base, according to the nature of the material forming the foundation, should make an ideal surface for combined automobile and wagon traffic.

For ordinary macadam, with heavy automobile traffic and medium heavy to light wagon traffic, limestone, or other so-called soft stone macadam preserves a smoother surface than do the granites, syenites and trap-rocks, and the limestone does not require the constant attention of renewing the cushion each year, as does the macadam formed of the harder grades of stone. When the macadam is formed by the harder grades, automobiles remove the cushion faster than it is formed by the grinding of the wagon traffic, and this results in a raveling of the top course and in a total loss in depth per year approximately the same as when the surface is composed of limestone, which wears smooth under the wagon traffic, constantly renews the cushion with the material worn off the surface and presents a smooth surface at all times, at a greatly reduced cost for maintenance.

CONTRACTS COMPLETED DURING THE YEAR ENDED SEPTEMBER 30, 1908.

WATERTOWN–SACKETTS HARBOR–HENDERSON (SECTION 2) ROAD, NO. 235, JEFFERSON COUNTY.

Length, 2.23 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $15,180.

Contract dated, July 7, 1906.

Work commenced, July 24, 1906.

Work completed, October 10, 1907.

Final account, $17,986.46.

Contractor, Celestin C. Burns.

Engineers in charge, D. C. Wedgeworth and Frederick S. Strong.

This contract provides for the improvement of a portion of the Watertown–Sacketts Harbor turnpike, connecting Contracts Nos. 181 and 237, the completion of which now provides a continuous stretch of State road from the Watertown city line to the corporation line of the village of Sacketts Harbor, a distance of about 8 miles. The macadam is formed of local limestone, in general 6

BARGE CANAL, CONTRACT NO. 10.
Riprapped dike separating Oswego river and Barge canal channel.

inches in thickness. In special places, where weak foundation was found, the macadam was made 9 inches in thickness.

HENDERSON HARBOR ROAD, NO. 238, JEFFERSON COUNTY.

Length, 5.09 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $30,450.

Contract dated, July 7, 1906.

Work commenced, April 15, 1907.

Work completed, September 24, 1908.

Final account, $33,852.52.

Contractor, Celestin C. Burns.

Engineer in charge, Frederick S. Strong.

This contract provides for the improvement of that section of the Lake road between Sacketts Harbor and Henderson Harbor extending from the town line of Henderson, near Campbells Point, to the easterly end of the hamlet of Henderson Harbor. The macadam is formed of local limestone 6 inches in depth, laid on a stone sub-base course, varying from 4 to 8 inches in depth where soft clay foundation was encountered.

UTICA–ONEIDA CASTLE (SECTION 1) ROAD, NO. 250, ONEIDA COUNTY.

Length, 8.53 miles.

Width of macadam, 16 feet; width of asphalt, 23 feet.

Engineer's preliminary estimate of total cost, including engineering, $144,100.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, December 18, 1907.

Final account, $146,707.70.

Contractors, Casey and Murray.

Engineer in charge, George R. Winslow.

This contract provides for the improvement of a portion of the Genesee turnpike from the city line of the city of Utica to the corporation line of the village of New Hartford, starting again at the easterly corporation line of the village of New Hartford

and extending to a point about half way to the village of Clinton; thence on a new location for a distance of about a mile and a half to a junction of the Seneca turnpike at the hamlet of Kirkland; thence on the Seneca turnpike to the hamlet of Lairdsville, where it connects with road No. 271.

The plans as originally prepared provided for a macadam road 16 feet in width for the entire distance. On the section of this road between the city line of Utica and the village of New Hartford the abutting property owners are incorporated in two separate road districts, whereby they are authorized to vote appropriations and levy and collect the same for highway purposes only. A committee from these districts petitioned the State Engineer to provide for a better class of pavement than the plans called for between the city line of Utica and the corporation line of the village of New Hartford, a distance of 1.2 miles, setting forth in the petition that they would provide for the additional expense of an asphalt pavement over and above the cost of the ordinary macadam. The plans were therefore revised for this section of road, providing for an asphalt surface on a concrete base for a width of 23 feet, together with concrete curbs and gutters and other accessories. The additional cost of such construction over a macadam road 20 feet in width was estimated at $28,200, which sum was made available and subject to draft of the State Engineer and Surveyor.

The road was therefore improved on this basis: From Utica to New Hartford, 1.2 miles, it has an asphalt surface 23 feet in width; from New Hartford to Lairdsville, 5.11 miles, a macadam surface 16 feet in width, the bottom course being 3 inches in thickness of local stone, the top course from New Hartford to Kirkland 3 inches in depth of Little Falls syenite, and from Kirkland to Lairdsville 3 inches in depth of local stone.

DEPOSIT ROAD, NO. 265, BROOME COUNTY.

Length, 2.78 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $30,000.

Contract dated, July 12, 1906.

Work commenced, July, 1906.
Work completed, July 10, 1908.
Final account, $26,678.30.
Contractor, County of Broome.
Engineers in charge, Guy L. Noble and E. H. Stewart.

This contract provides for the improvement of the so-called Ouaquaga road, extending easterly from the village of Deposit, the macadam being formed of 3 inches of local stone and 3 inches of trap-rock.

TUNNEL ROAD, NO. 266, BROOME COUNTY.

Length, 1.70 miles.
Width of macadam, 12 feet.
Engineer's preliminary estimate of total cost, including engineering, $13,750.
Contract dated, July 12, 1906.
Work commenced, May 28, 1907.
Work completed, July 28, 1908.
Final account, $13,341.55.
Contractors, Hinman and Sproul.
Engineers in charge, S. J. Stewart and George C. Mills.

This contract provides for the improvement of the main road through the unincorporated village of Sanitaria Springs, extending out a short distance on each side. The macadam surface is 6 inches in depth, 3 inches of local stone bottom course and 3 inches of Little Falls syenite top course.

CASTLE CREEK ROAD, NO. 267, BROOME COUNTY.

Length, 6 miles.
Width of macadam, 12 feet.
Engineer's preliminary estimate of total cost, including engineering, $54,750.
Contract dated, July 12, 1906.
Work commenced, July, 1906.
Work completed, June 15, 1908.
Final account, $55,109.27.
Contractor, County of Broome.

Engineers in charge, R. J. Marcher and S. O. Steere.

This road extends from the junction of road No. 126 on the west side of Chenango valley up the Castle creek valley through the hamlets of Glen Castle and Castle Creek to the Barker town line. The macadam surface is 8 inches in thickness, all of crushed local fieldstone, which consists mostly of the Chemung sandstone.

GULF BRIDGE (SECTION 1) ROAD, NO. 274, BROOME COUNTY.

Length, 1.75 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $15,250.

Contract dated, July 12, 1906.

Work commenced, April 24, 1907.

Work completed, December 20, 1907.

Final account, $14,175.84.

Contractor, County of Broome.

Engineer in charge, T. D. Ringwood.

This road extends from the westerly end of the Chenango river bridge, in the unincorporated village of Chenango Forks, westerly and southerly on the so-called Gulf Bridge road toward Binghamton. The macadam surface is 6 inches in thickness, the bottom course being 3 inches in thickness of local stone and the top course 3 inches in thickness of Morristown, New Jersey, trap-rock.

OSWEGO–STERLING ROAD, NO. 280, OSWEGO COUNTY.

Length, 1.66 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $13,550.

Contract dated, September 18, 1906.

Work commenced, May 27, 1907.

Work completed, December 14, 1907.

Final account, $16,135.95.

Contractor, The Barnett Contracting Company.

Engineer in charge, Harry H. Greene.

This road extends from the city line of the city of Oswego westerly on the Sterling or Fair Haven road to the Fruit Valley

Four Corners. A portion of this road has a very unstable foundation, which was reinforced with a so-called V-shaped stone drain, the same being formed of fieldstone 10 feet wide, 6 inches in depth on the sides and 15 inches in depth in the center. The macadam surface is 6 inches in thickness, the bottom course being 4½ inches in depth of crushed local stone and the top course 1½ inches in depth of Morristown, New Jersey, trap-rock.

SOUTH SALINA STREET ROAD, NO. 290, ONONDAGA COUNTY.

Length, 1.06 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $13,900.

Contract dated, August 31, 1906.

Work commenced, May 6,1907.

Work completed, April 25, 1908.

Final account, $12,127.22.

Contractor, William J. Dwyer.

Engineer in charge, L. D. Brownell.

This road, as its name would indicate, is a continuation of South Salina street in Syracuse, from East Onondaga Four Corners southerly. The macadam surface is 8 inches in thickness, the bottom course being 5 inches in depth of local limestone and the top course 3 inches in depth of Little Falls syenite.

CEMETERY ROAD, NO. 291, ONONDAGA COUNTY.

Length, 0.89 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $11,400.

Contract dated, October 18, 1907.

Work commenced, April 20, 1908.

Work completed, September 28, 1908.

Final account, $10.111.63.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, J. O. Burt.

This road extends from the city line of Syracuse on the St. Agnes Cemetery road west through the unincorporated village of

Onondaga Hill. The macadam surface is 6 inches in depth, all of local limestone.

MOHAWK RIVER ROAD, FLOYD, NO. 295, ONEIDA COUNTY.

Length, 2.80 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $29,750.

Contract dated, July 10, 1906.

Work commenced, November 1, 1906.

Work completed, December 26, 1907.

Final account, $31,043.81.

Contractors, Casey and Murray.

Engineers in charge, C. J. Myers and George W. Bradley.

This contract provides for the improvement of that portion, within the town of Floyd, of the River road on the north side of the Mohawk river between Deerfield Corners and Rome, connecting roads Nos. 296 and 560. The macadam surface is 7 inches in thickness, the bottom course being 4 inches in depth of limestone and the top course 3 inches in depth of Little Falls syenite.

MOHAWK RIVER ROAD, MARCY, NO. 296, ONEIDA COUNTY.

Length, 4.54 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $49,200.

Contract dated, July 10, 1906.

Work commenced, August, 1906.

Work completed, December 31, 1907.

Final account, $52,078.64.

Contractors, Casey and Murray.

Engineers in charge, C. J. Myers and George W. Bradley.

This contract provides for the improvement of that portion of the Mohawk river road extending easterly from the Floyd–Marcy town line at a junction with road No. 295, some 4½ miles in the town of Marcy, to a junction with road No. 297, which was finished last year. The macadam is 7 inches in thickness, the bottom course being 4 inches in depth of limestone and the top course 3 inches in depth of Little Falls syenite.

VALLEY ROAD, MARCELLUS, NO. 328, ONONDAGA COUNTY.

Length, 1.31 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $19,500.

Contract dated, August 31, 1906.

Work commenced, August 28, 1907.

Work completed, September 22, 1908.

Final account, $18,846.35.

Contractor, William J. Dwyer.

Engineer in charge, R. V. Collins.

This road extends northerly along Nine-Mile creek valley from the corporation line of the village of Marcellus through Marcellus Falls to the Camillus town line. The macadam surface is 6 inches in depth, all of local limestone, laid on a stone sub-base course 6 inches in depth over the entire length of the road.

VALLEY ROAD, CAMILLUS, NO. 329, ONONDAGA COUNTY.

Length, 2.32 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $34,400.

Contract dated, November 23, 1906.

Work commenced, April 10, 1907.

Work completed, August 31, 1908.

Final account, $30,972.03.

Contractor, Charles H. Quereau.

Engineer in charge, R. V. Collins.

This road is an extension of road No. 328 from the Marcellus town line northerly along the Nine-Mile creek valley to the corporation line of the village of Camillus. The macadam surface is 6 inches in depth, all of local limestone.

AUGUSTA ROAD, ORISKANY FALLS SECTION, NO. 369, ONEIDA COUNTY.

Length, 2.99 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $30,600.

Contract dated, August 29, 1906.

Work commenced, April 22, 1907.

Work completed, December 31, 1907.

Final account, $28,453.57.

Contractor, John H. Gordon.

Engineer in charge, George R. Winslow.

This road extends northerly from the corporation line of the village of Oriskany Falls, on the main road to Augusta and Vernon Center, to the four corners of the unincorporated village of Augusta. The macadam surface is 6 inches in depth, all of local limestone.

BARKER ROAD, NO. 375, BROOME COUNTY.

Length, 0.62 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $6,550.

Contract dated, July 12, 1906.

Work commenced, July 1, 1907.

Work completed, December 20, 1907.

Final account, $6,367.43.

Contractor, County of Broome.

Engineer in charge, T. D. Ringwood.

This road extends from the easterly end of the Chenango river bridge, in the unincorporated village of Chenango Forks, through said village to the Chenango county line. The macadam surface is 6 inches in depth, the bottom course being 3 inches in depth of local stone and the top course 3 inches in depth of Morristown, New Jersey, trap-rock.

OWASCO ROAD, NO. 383, CAYUGA COUNTY.

Length, 2.19 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $21,500.

Contract dated, July 10, 1906.

Work commenced, July 30, 1906.

Work completed, December 20, 1907.

Final account, $19,224.08.

Contractors, Brayer Brothers.

Engineer in charge, E. C. Clark.

This road extends from the city line of the city of Auburn, on the easterly side of the Owasco outlet, to the foot of Owasco lake. The macadam surface is 6 inches in thickness, all of local limestone. After the macadam has been completed the surface was treated with an application of Tarvia and syenite screenings.

Augusta Road, Vernon Center Section, No. 406, Oneida County.

Length, 3.88 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $38,900.

Contract dated, November 27, 1906.

Work commenced, April 22, 1907.

Work completed, December 26, 1907.

Final account, $35,930.48.

Contractor, Allyn G. Bridge.

Engineer in charge, George W. Bradley.

This road extends southerly from a junction with the Seneca turnpike road, No. 271, through the village of Vernon Center to the Augusta town line, connecting roads Nos. 438 and 368. The macadam surface is 6 inches in thickness, all of local limestone.

Belleville–Adams (Section 1) Road, No. 424, Jefferson County.

Length, 1.60 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $11,900.

Contract dated, November 16, 1906.

Work commenced, April 15, 1907.

Work completed, November 15, 1907.

Final account, $11,011.31.

Contractor, Frederick Williams.

Engineer in charge, Frederick S. Strong.

Contract dated, August 29, 1906.
Work commenced, April 22, 1907.
Work completed, December 31, 1907.
Final account, $28,453.57.
Contractor, John H. Gordon.
Engineer in charge, George R. Wins...

This road extends northerly from th... village of Oriskany Falls, on the main ... non Center, to the four corners of ... Augusta. The macadam surface ... limestone.

BARKER ROAD, No. ...

Length, 0.62 mile.
Width of macadam, 16 fe...
Engineer's preliminary ... neering, $6,550.
Contract dated, July ...
Work commenced, Ju...
Work completed, D...
Final account, $6...
Contractor, Coun...
Engineer in char...

This road exte... bridge, in the main... said village to ... is 6 inche... local sto... New Je...

Le...
Wi...
E... gi...

·. 154, TOMPKINS COUNTY.

: feet.
ary estimate of total cost, including en-

August 30, 1906.
. ·d, September 17, 1906.
·d, May 21, 1908.
··unt, $33,216.18.
·r, County of Tompkins.
·rs in charge, S. J. Stewart and William H. Snyder.
· road is in two sections, section No. 1 extending northerly ·he city line of Ithaca along the head of Cayuga lake, a dis- ·· of about one-half mile; section No. 2 extends southwesterly ·om the city line of Ithaca, on the road to Enfield, a little over : miles. The macadam surface is 6 inches in depth, the bottom course being 4 inches in depth of local stone and the top course 2 inches in depth of limestone from the Le Roy quarries.

NORWICH–NORTH NORWICH ROAD, NO. 505, CHENANGO COUNTY.

Length, 4.60 miles.
Width of macadam, 12 and 16 feet.
Engineer's preliminary estimate of total cost, including engineering, $45,848.
Contract dated, November 10, 1906.
Work commenced, April 8, 1907.
Work completed, June 25, 1908.
Final account, $40,969.88.
Contractor, Daniel V. Brown.
Engineer in charge, S. B. McDonald.
This road extends northerly on the west side of the Chenango river from the corporation line of the village of Norwich to the ·ks in the road about one-half mile south of North Norwich. ·e macadam surface is 6 inches in depth, all of limestone from ·e Oriskany Falls quarries.

·HITTENANGO–EAGLE VILLAGE ROAD, NO. 506, MADISON COUNTY.

Length, 2.18 miles.
Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $21,700.

Contract dated, July 6, 1906.

Work commenced, July 25, 1906.

Work completed, November 25, 1907.

Final account, $18,727.49.

Contractor, William I. Tyler.

Engineer in charge, T. F. Nichols.

This road extends from the corporation line of the village of Chittenango westerly over the old Seneca turnpike to the Onondaga county line. The macadam surface is 6 inches in depth, all of local limestone.

OSWEGO-MEXICO (SECTION 1) ROAD, NO. 509, OSWEGO COUNTY.

Length, 5.40 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $50,000.

Contract dated, July 6, 1906.

Work commenced, July 19, 1906.

Work completed, October 10, 1907.

Final account, $44,853.81.

Contractors, Mott and Kemper.

Engineers in charge, E. H. Stewart and Harry H. Greene.

This road extends from the city line of Oswego easterly on the so-called Mexico road through the town of Scriba to the town line of New Haven. The macadam surface is 6 inches in depth, all of crushed local fieldstone, which consisted mostly of Medina, Oneida and Oswego sandstones.

FULTON-VOLNEY ROAD, NO. 539, OSWEGO COUNTY.

Length, 2.09 miles.

Width of gravel, 20 feet.

Engineer's preliminary estimate of total cost, including engineering, $20,100.

Contract dated, December 4, 1907.

Work commenced, April 10, 1908.

Work completed, August 15, 1908.

Final account, $15,821.63.

Contractors, Chambers and Grady.

Engineer in charge, A. H. Scheutzow.

This road extends from the top of the hill, about one-half mile east of the city line of Fulton, to Volney Center. It is improved with a gravel surface 9 inches in depth, the gravel being passed through a rotary screen, which separated it into four sizes, the screen having perforations of the following dimensions: ¾, 1¼, 2½ and 4 inches. The bottom course was formed of the 2½ to 4-inch product, laid 5 inches in depth when rolled in place and 12 feet in width, and filled with the product passing through the ¾-inch screen. The top course for 12 feet in width and 4 inches in depth was formed of the product passing over the 1¼-inch screen and falling through the 2½-inch screen, which, after being rolled in place, was filled with the product passing through the ¾-inch screen and puddled as required for macadam. The product passing over the ¾-inch screen and falling through the 1¼-inch screen was used to form the shoulder, or wings, for four feet in width on each side of the 12-foot section, giving a gravel surface, when completed, 20 feet in width. The road apparently is giving very good satisfaction, and where a good grade of gravel can be obtained and the road to be improved has medium to light traffic, this method of construction is recommended.

CONTRACTS PENDING SEPTEMBER 30, 1908.

CORTLAND–HOMER ROAD, NO. 208, CORTLAND COUNTY.

Length, 0.54 mile.

Width of macadam, 16 and 20 feet.

Engineer's preliminary estimate of total cost, including engineering, $8,600.

Contract dated, December 31, 1906.

Work commenced, July 10, 1907.

Work completed, 96 per cent.

Contractors, John Weber and Sons, Inc.

Engineer in charge, C. J. Myers.

This contract provides for the improvement of the main road from the corporation line of the village of Cortland to the corpo-

ration line of the village of Homer. The macadam surface is in general 20 feet in width, divided into two strips each 10 feet wide, one on either side of the single electric railway track, which occupies the center of the street. The macadam is 6 inches in depth, laid in two courses, the bottom course being 4 inches in depth of imported limestone and the top course 2 inches in depth of Morristown, New Jersey, trap-rock. The improvement is complete, but the final estimate has not as yet been rendered.

ADAMS-HENDERSON (SECTION 2) ROAD, NO. 234, JEFFERSON COUNTY.

Length, 6.89 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $49,950.

Contract dated, July 7, 1906.

Work commenced, May 2, 1907.

Work completed, 99 per cent.

Contractor, Celestin C. Burns.

Engineer in charge, Frederick S. Strong.

This road is an extension of road No. 183 on the main highway from Adams to Henderson Harbor. The macadam surface is 6 inches in depth of local limestone, laid on a quarried stone sub-base course, varying from 6 inches to 12 inches in depth. It is expected that the improvement will be completed before the close of the present season.

REDWOOD-ALEXANDRIA BAY (SECTION 2) ROAD, NO. 236, JEFFERSON COUNTY.

Length, 4.19 miles.

Width of macadam, 12, 16 and 20 feet.

Engineer's preliminary estimate of total cost, including engineering, $38,200.

Contract dated, September 20, 1907.

Work commenced, May 11, 1908.

Work completed, 48 per cent.

Contractor, Stewart-Kerbaugh-Shanley Company.

Engineer in charge, L. Holmes.

This road is an extension of road No. 184 on the main highway from Redwood to Alexandria Bay. The macadam surface is generally 12 feet in width, except through the unincorporated village of Redwood, where for some distance the width is 20 feet. The macadam is 6 inches in thickness, all of local granite or Adirondack gneiss, the top course being bound with imported limestone screenings. It is anticipated that there will remain about one-half mile of macadam to be laid at the close of the present season.

COLEMAN HILL (SECTION 1) ROAD, NO. 245, ONONDAGA COUNTY.

Length, 1.21 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $15,600.

Contract dated, September 20, 1907.

Work commenced, April 1, 1908.

Work completed, 88 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, Louis Oppenheim.

This contract provides for the improvement of a portion of the highway leading from Jamesville to Pompey, the entire road being on a new location designed to reduce the steep grades on the so-called Coleman hill. The macadam surface is 6 inches in depth, all of local limestone. This improvement will no doubt be completed before the close of the present season.

UTICA–ONEIDA CASTLE (SECTION 2) ROAD, NO. 271, ONEIDA COUNTY.

Length, 8.53 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $86,500.

Contract dated, September 15, 1906.

Work commenced, May 1, 1907.

Work completed, 96 per cent.

Contractors, Casey and Murray.

Engineers in charge, W. W. Ewell and Louis Garbi, Jr.

This contract provides for the improvement of that section of

the Seneca turnpike running from the hamlet of Lairdsville to the corporation line of Oneida Castle, with the exception of that portion lying in the incorporated village of Vernon, being a continuation of road No. 250. The macadam surface is 6 inches in depth.

On that portion of the road east of Vernon the macadam is formed all of local limestone and on that portion west of Vernon the bottom course is 3 inches in depth of local limestone and the top course 3 inches in depth of Little Falls syenite.

It is expected that this contract will be entirely completed before the close of the present season.

SENECA RIVER ROAD, NORTH SIDE, NO. 273, SENECA COUNTY.

Length, 1.30 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $17,850.

Contract dated, December 4, 1907.

Work commenced, May 25, 1908.

Work completed, 93 per cent.

Contractors, Chambers and Grady.

Engineer in charge, A. L. Northrup.

This road extends from the corporation line of the village of Seneca Falls to the corporation line of the village of Waterloo along the north side of the Seneca river. The macadam surface is 6 inches in thickness, all of local limestone. It is expected that the improvement of this road will be entirely completed before the close of the present season.

UNION-MAINE ROAD, NO. 275, BROOME COUNTY.

Length, 3.04 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $31,500.

Contract, dated July 12, 1906.

Work commenced, July 16, 1907.

Work completed, 97 per cent.

Contractors, Hinman and Sproul.

Engineers in charge, E. H. Stewart and B. J. Finch.

This road extends from the corporation line of the village of Union northerly on the road to Maine to the foot of the hill at Union Center. The macadam surface is 8 inches in depth, all of local fieldstone. The improvement of this road is practically completed, but has not yet been formally accepted.

SYRACUSE–WATERTOWN ROAD, NO. 278, OSWEGO COUNTY.

Length, 2.41 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $26,950.

Contract dated, September 20, 1907.

Work commenced, July 6, 1908.

Work completed, 84 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, F. A. Gordon.

This road extends from the northerly end of the Oneida river bridge, at Brewerton, northerly to the corporation line of the village of Central Square. The macadam surface is 6 inches in depth, laid in two courses, the bottom course being 4 inches in depth of crushed local fieldstone, and the top course 2 inches in depth of limestone from the Split Rock quarries at Syracuse. It is expected that the improvement of this road will be completed before the close of the present season.

WEST OSWEGO RIVER ROAD, NO. 279, OSWEGO COUNTY.

Length, 2.48 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $27,800.

Contract dated, September 20, 1907.

Work commenced, May 11, 1908.

Work completed, 94 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, S. A. Patterson.

This road extends from the city line of Oswego southerly on the west side of the Oswego river to the road extending to the station in the unincoroprated village of Minetto. The macadam

surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of Morristown, New Jersey, trap-rock.

It is expected that the improvement of this road will be completed before the close of the present season.

WEST LAKE (SECTION 2) ROAD, NO. 292, ONONDAGA COUNTY.

Length, 1 mile.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $10,550.

Contract dated, July 10, 1906.

Work commenced, August 18, 1908.

Work completed, 30 per cent.

Contractor, C. H. Quereau Co. Inc.

Engineer in charge, F. F. Miller.

This road is a one-mile section of the road extending southerly from Skaneateles on the west side of Skaneateles lake, connecting roads Nos. 48 and 486. The macadam surface is 6 inches in thickness, all of imported limestone from the Glenside quarries.

It is expected that the improvement of this road will be completed before the close of the present season.

EAST LAKE (SECTION 2) ROAD, NO. 293, ONONDAGA COUNTY.

Length, 1 mile.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $9,500.

Contract dated, July 10, 1906.

Work commenced, September, 1906.

Work completed, 63 per cent.

Contractor, C. H. Quereau Co. Inc.

Engineers in charge, George D. Williams and F. F. Miller.

This road is a one-mile section of the highway extending southerly from the village of Skaneateles along the east side of Skaneateles lake, connecting roads Nos. 122 and 431. The macadam is

6 inches in depth, all of imported limestone from the Glenside quarries.

It is expected that the improvement of this road will be completed before the close of the present season.

RESERVATION ROAD, FAYETTE, NO. 320, SENECA COUNTY.

Length, 5.72 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $50,500.

Contract dated, September 18, 1907.

Work commenced, May 25, 1908.

Work completed, 53 per cent.

Contractor, Henry C. Schroeder.

Engineer in charge, J. G. Palmer.

This road extends southerly from the corporation line of the village of Seneca Falls to the four corners in the hamlet of Fayette. The macadam surface is 6 inches in depth, all of local limestone.

The contractor does not seem to be able to push his work along fast enough to complete the improvement this year.

SKANEATELES–HAMILTON TURNPIKE (SECTION 1) ROAD, NO. 330, ONONDAGA COUNTY.

Length, 2.44 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering $28,500.

Contract dated, September 20, 1907.

Work commenced, April 20, 1908.

Work completed, 81 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, N. E. Young.

This contract provides for the improvement of the old Skaneateles-Hamilton turnpike, extending from the four corners, about one mile west of Tully, through the hamlet of Vesper to the Otisco town line. The macadam surface is 6 inches in depth, all of local limestone.

It is expected that the improvement of this road will be completed before the close of the present season.

CAYUGA HEIGHTS ROAD, NO. 336, TOMPKINS COUNTY.

Length, 3.17 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,400.

Contract dated, August 30, 1906.

Work commenced, October 15, 1906.

Work completed, 87 per cent.

Contractor, County of Tompkins.

Engineers in charge, S. J. Stewart and William H. Snyder.

This road extends from the city line of Ithaca northerly through the so-called Cayuga Heights, principally on a new location designed to obtain a more direct route into the city for that section of the town on the hill north of Ithaca and east of Cayuga lake. The macadam surface is 6 inches in depth, laid in two courses, the bottom course being 4 inches in depth of the harder grades of Ithaca shale, and the top course 2 inches in depth of imported limestone from the Blakeslee quarries.

The improvement of this road is practically completed, but has not as yet been formally accepted.

SYRACUSE TURNPIKE ROAD, NO. 337, MADISON COUNTY.

Length, 1.58 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $13,800.

Contract dated, September 20, 1907.

Work commenced, September 1, 1908.

Work completed, 44 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, R. V. Collins.

This road extends from the road crossing at Cazenovia station northwesterly along the west shore of Cazenovia lake on the main road to Manlius and Syracuse to the top of the hill at the tunnel. The macadam surface is 6 inches in thickness, all of limestone from the Manlius quarries.

It is expected that the improvement of this road will be completed before the close of the present season.

CATSKILL TURNPIKE (SECTION 2) ROAD, NO. 338, TOMPKINS COUNTY.

Length, 1.38 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $14,900.

Contract dated, August 30, 1906.

Work commenced, October 2, 1906.

Work completed, 99 per cent.

Contractor, County of Tompkins.

Engineers in charge, S. J. Stewart and William H. Snyder.

This contract provides for the improvement of a portion of the main road extending from Ithaca to Slaterville, connecting roads Nos. 72 and 483. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in depth of crushed local fieldstone and the top course 2 inches in depth of imported limestone from the Blakeslee quarries.

The improvement of this road is entirely completed, but has not as yet been formally accepted.

GEORGETOWN ROAD, NO. 339, MADISON COUNTY.

Length, 3.29 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $31,400.

Contract dated, September 18, 1906.

Work commenced, June 3, 1907.

Work completed, 93 per cent.

Contractor, William I. Tyler.

Engineers in charge, T. F. Nichols and C. F. de Clercq.

This road extends from the railroad crossing at Georgetown station to and through the unincorporated village of Georgetown on the main road to the Otselic valley. The macadam surface is 6 inches in depth, all of imported limestone from the Manlius quarries. This road is practically completed, but has not as yet been formally accepted.

COLLAMER ROAD, NO. 348, ONONDAGA COUNTY.

Length, 1.90 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $20,400.

Contract dated, July 9, 1906.

Work commenced, July, 1906.

Work completed, 98 per cent.

Contractor, William J. Dwyer.

Engineers in charge, William H. Snyder and George D Williams.

This road extends from the corporation line of the village of Eastwood northerly and easterly on the road to Collamer. The macadam surface is 6 inches in thickness of imported limestone from the Split Rock quarries. The improvement of this road was practically completed in 1906, but, owing to the heavy traffic to which the road was subjected from the brick yards located on the road, it was decided not to accept the contract and to reinforce the thickness of macadam with 3 inches of Little Falls syenite. As several other contracts, which are not entirely completed at this date have been awarded to this contractor, he has not as yet been able to take up the work of placing the additional course of macadam, but expects to proceed with the work early next spring. The macadam surface, while not entirely satisfactory, has sustained the traffic with no defects other than being deeply rutted.

AUGUSTA ROAD, AUGUSTA SECTION, NO. 368, ONEIDA COUNTY.

Length, 3.38 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $36,000.

Contract dated, November 23, 1906.

Work commenced, September 9, 1907.

Work completed, 99 per cent.

Contractor, John H. Gordon.

Engineers in charge, George R. Winslow and W. W. Ewell.

This contract provides for the improvement of that portion of the main road from Vernon to Oriskany Falls extending northerly

from the four corners in the hamlet of Augusta to the Vernon town line. The macadam is 6 inches in depth, laid in two courses, the bottom course being 4 inches in depth of crushed local fieldstone and the top course 2 inches in depth of local limestone.

The improvement of this road is practically completed, but has not as yet been formally accepted.

MAINE ROAD, NO. 374, BROOME COUNTY.

Length, 3.37 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $33,550.

Contract dated, July 12, 1906.

Work commenced, January, 1907.

Work completed, 98 per cent.

Contractors, Hinman and Sproul.

Engineers in charge, R. J. Marcher and B. J. Finch.

This road is a continuation of road No. 275, extending from Union Center to the hamlet of Maine. The macadam surface is 8 inches in depth, all of crushed local fieldstone. The improvement of this road is practically completed, but has not as yet been formally accepted.

MCGRAWVILLE ROAD, NO. 378, CORTLAND COUNTY.

Length, 2.90 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $30,750.

Contract dated, July 10, 1906.

Work commenced, August 6, 1906.

Work completed, 94 per cent.

Contractor, John Weber and Sons, Inc.

Engineers in charge, N. E. Young and C. J. Myers.

This road extends from the city line of Cortland to the corporation line of the village of McGrawville. The macadam surface is 6 inches in depth, laid in two courses, the bottom course being 4 inches in depth of crushed local fieldstone and the top course 2

inches in depth of imported limestone from the Rock Cut quarries at Syracuse.

The improvement of this road was completed and accepted in 1907, but final payment has not as yet been made.

HARFORD ROAD, NO. 379, CORTLAND COUNTY.

Length, 0.91 mile.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $7,600.

Contract dated, September 19, 1906.

Work commenced, October 10, 1907.

Work completed, 92 per cent.

Contractor, John Weber and Sons, Inc.

Engineer in charge, George Yavroumis.

This contract provides for the improvement of a short section of road through the unincorporated village of Harford. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from the Blakeslee quarries. The improvement is practically completed, but has not as yet been formally accepted.

STATE ROAD, HOMER, NO. 380, CORTLAND COUNTY.

Length, 4.39 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $42,400.

Contract dated, November 14, 1906.

Work commenced, July 17, 1907.

Work completed, 96 per cent.

Contractors, Mott and Kemper.

Engineers in charge, N. E. Young and C. J. Myers.

This road extends from the corporation line of the village of Homer northwesterly on the so-called Scott road to the Scott town line. The macadam surface is 6 inches in depth, laid in two courses, the bottom course being 4 inches in depth of crushed local fieldstone and the top course 2 inches in depth of imported limestone from the Syracuse quarries.

It is expected that the improvement of this road will be completed before the close of the present season.

STATE ROAD, SCOTT, No. 381, CORTLAND COUNTY.

Length, 2.72 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $27,300.

Contract dated, September 20, 1907.

Contractor, Stewart–Kerbaugh–Shanley Company.

No work has been done under this contract.

FLEMING ROAD, No. 384, CAYUGA COUNTY.

Length, 3.17 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $31,960.

Contract dated, November 10, 1906.

Work commenced, June 17, 1907.

Work completed, 97 per cent.

Contractor, The Scofield Company.

Engineers in charge, O. M. Severson and Frank W. Bristow.

This road extends from the Owasco creek bridge, at the foot of Owasco lake, westerly and southerly along the west shore of Owasco lake. The contractors on this road went into the hands of a receiver when the road was 51 per cent completed. After some delay the State Engineer readvertised the work of completing the contract and it was awarded to Michael F. Dollard, May 21, 1908, the amount of the contract being $13,579.80, which is within the amount available for the work remaining to be done. The macadam surface is 6 inches in thickness, all of local limestone.

The improvement is now practically completed, but has not as yet been formally accepted.

VESTAL ROAD, No. 420, BROOME COUNTY.

Length, 3.69 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $35,600.

Contract dated, July 12, 1906.

Work commenced, July 20, 1908.

Work completed, 40 per cent.

Contractors, Hinman and Sproul.

Engineer in charge, B. J. Finch.

This road extends from the southerly end of the Susquehanna river bridge at Vestal southerly and westerly through the unincorporated village of Vestal to the Tioga county line. The macadam is 6 inches in thickness, laid in two courses, the bottom course being 3 inches in thickness of crushed local fieldstone and the top course 3 inches in thickness of Morristown, New Jersey, trap-rock.

It is expected that the improvement of this road will be completed before the close of the present season.

CONKLIN ROAD, NO. 421, BROOME COUNTY.

Length, 7.83 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $84,100.

Contract dated, December 2, 1907.

Work commenced, April 22, 1908.

Work completed, 89 per cent.

Contractors, Casey and Murray.

Engineer in charge, T. D. Ringwood.

This road extends easterly from the city line of Binghamton on the southerly side of the Susquehanna river to and through the hamlet of Conklin. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of Morristown, New Jersey, trap-rock.

It is expected that the improvement of this road will be completed before the close of the present season.

WATERTOWN–THERESA (SECTION 3) ROAD, NO. 423, JEFFERSON COUNTY.

Length, 4.19 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $40,350.

Contract dated, September 20, 1907.

Work commenced, September 15, 1908.

Work completed, 5 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, L. Holmes.

This road extends southerly from the corporation line of the village of Theresa, on the main road to Watertown, to the town line of Le Ray. The macadam surface is 6 inches in thickness, all of local limestone. Owing to the large number of contracts awarded to this contractor, it was found impracticable to start the improvement of this road until late in the season.

STATE (SECTION 2) ROAD, NO. 426, JEFFERSON COUNTY.

Length, 4.05 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $46,950.

Contract dated, March 23, 1908.

Work commenced, June 1, 1908.

Work completed, 84 per cent.

Contractor, William J. Semper.

Engineers in charge, J. N. Slater and C. W. Johnson.

This contract provides for the improvement of the road extending from the corporation line of the village of Adams to the creek bridge in the hamlet of Lorraine, with the exception of the one-mile section improved under road No. 186. The macadam surface is 6 inches in thickness, all of crushed local hardheads, consisting principally of granite and Adirondack gneiss.

It is expected that the improvement of this road will be completed before the close of the present season.

WATERTOWN–CARTHAGE (SECTION 3) ROAD, NO. 428, JEFFERSON COUNTY.

Length, 4.88 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $34,400.

Contract dated, December 18, 1907.

Work commenced, May 15, 1908.

Work completed, 75 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, Frederick S. Strong.

This road extends from the corporation line of the village of Carthage westerly on the northerly side of Black river to the river bridge at DeFeriet's, being a continuation of road No. 487. The macadam surface is 6 inches in thickness, all of local limestone.

It is expected that the improvement of this road will be completed before the close of the present season.

SKANEATELES–SPAFFORD ROAD, NO. 431, ONONDAGA COUNTY.

Length, 2.50 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $27,700.

Contract dated, July 20, 1906.

Work commenced, November 8, 1906.

Work completed, 97 per cent.

Contractor, J. Charles Dayton.

Engineers in charge, J. O. Burt and F. F. Miller.

This contract provides for the improvement of that portion of the Skaneateles East Lake road from the southerly end of road No. 292 to the top of the Gulf hill on the road to Spafford. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from the Borodino quarries. This contract is practically completed, but has not been formally accepted.

AUGUSTA ROAD, LOWELL AND SPENCER SECTIONS, NO. 438, ONEIDA COUNTY.

Length, 7.10 miles.

Width of macadam, 14 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $70,500.

Contract dated, August 29, 1906.

Work commenced, September 12, 1906.

Work completed, 93 per cent.

Contractor, M. F. Dollard.

Engineers in charge, O. J. Myers and Louis Garbi, Jr.

This road extends from the outer city line of Rome southerly through the hamlet of Lowell to the Seneca turnpike north of Vernon Center. The macadam surface is 6 inches in thickness, all of imported limestone from the Munnsville and Oriskany Falls quarries. The macadam is reinforced with a gravel sub-base course, ranging from 4 inches to 8 inches in depth. This contract is practically completed, but has not as yet been formally accepted.

LISLE-CENTER LISLE ROAD, NO. 445, BROOME COUNTY.

Length, 2.70 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $35,250.

Contract dated, December 20, 1907.

Work commenced, April 27, 1908.

Work completed, 90 per cent.

Contractor, Joseph McCormick.

Engineer in charge, R. B. Hoadley, Jr.

This road extends from the corporation line of the village of Lisle to the hamlet of Center Lisle. The macadam surface is 6 inches in thickness, constructed in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of Morristown, New Jersey, trap-rock. It is expected that this contract will be completed before the close of the present season.

PHŒNIX-PENNELLVILLE ROAD, NO. 450, OSWEGO COUNTY.

Length, 1.92 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $21,550.

Contract dated, September 20, 1907.

Contractor, Stewart-Kerbaugh-Shanley Company.

No work has been done under this contract.

MINETTO–FULTON ROAD, NO. 451, OSWEGO COUNTY.

Length, 1.99 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $24,300.

Contract dated, January 14, 1908.

Contractor, Stewart–Kerbaugh–Shanley Company.

No work has been done under this contract.

CICERO–SOUTH BAY ROAD, NO. 452, ONONDAGA COUNTY.

Length, 3.53 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $33,100.

Contract dated, July 9, 1906.

Work commenced, June 8, 1908.

Work completed, 27 per cent.

Contractor, William J. Dwyer.

Engineer in charge, N. E. Young.

This road extends from the Syracuse–Brewerton road, in the village of Cicero, to the hotel at South Bay. The macadam surface is 6 inches in thickness, all of local limestone.

To the contractor on this road were awarded a number of contracts in 1906, but, owing to his limited capital and plant, he was apparently unable to take up the improvement of this road until late in the present season. The work will not be completed by the end of the present season.

WYCKOFF ROAD, NO. 455, TOMPKINS COUNTY.

Length, 0.34 mile.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $4,500.

Contract dated, August 30, 1906.

Work commenced, November 27, 1907.

Work completed, 34 per cent.

Contractor, County of Tompkins.

Engineer in charge, R. E. Swinney.

This road is a short spur extending from the Cayuga Heights road, No. 336, and leading toward the Cornell University campus. The macadam surface is 6 inches in thickness, constructed in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from the Blakeslee quarries. It is expected that the road will be completed before the end of the present season.

CATSKILL TURNPIKE (SECTION 3) ROAD, NO. 483, TOMPKINS COUNTY.

Length, 4.44 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $44,400.

Contract dated, August 30, 1906.

Work commenced, July 15, 1907.

Work completed, 50 per cent.

Contractor, County of Tompkins.

Engineers in charge, William H. Snyder and C. D. Murray.

This contract provides for the improvement of a portion of the Ithaca–Slaterville road extending from the end of contract No. 338 to the village of Slaterville. This contract was originally awarded to the County of Tompkins. It has been sublet and resublet. While the present contractors are making fairly good progress, it is not anticipated that the work will be completed this season. The macadam surface is 6 inches in thickness, constructed in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from the Blakeslee quarries.

SKANEATELES WEST LAKE (SECTIONS 3, 4 AND 5) ROAD NO. 486, ONONDAGA COUNTY.

Length, 3.37 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,000.

Contract dated, November 10, 1906.

Contract dated, September 20, 1907.

Work commenced, April 20, 1908.

Work completed, 53 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, J. M. Howard.

This road extends southwesterly from the corporation line of the village of Massena on the so-called Waddington road. The macadam surface is 7 inches in thickness, all of crushed local hardheads, consisting of Adirondack gneiss, granite, sandstone and limestone. It is not expected that the improvement will be completed this season.

CORTLAND–DRYDEN (SECTION 2) ROAD, NO. 535, CORTLAND COUNTY.

Length, 2.70 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $21,750.

Contract dated, September 20, 1907.

Work commenced, June 29, 1908.

Work completed, 51 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, C. J. Myers.

This road extends from the end of road No. 215 southwesterly on the so-called Dryden road to the Tompkins county line. The macadam surface is 6 inches in thickness, constructed in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from the Blakeslee quarries. The improvement of this road was not started until late in the season and it is not anticipated that it will be completed this year.

UTICA–BRIDGEWATER ROAD, NO. 559, ONEIDA COUNTY.

Length, 9.09 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $81,000.

Contract dated, September 19, 1907.

Work commenced, April 15, 1908.

Work completed, 82 per cent.

Contractors, Casey and Murray.

Engineer in charge, Frank C. Tolles.

This road extends from the southerly end of road No. 71, at the Paris–New Hartford town line, southerly through the villages of Clayville and Cassville to the corporation line of the village of Bridgewater, with the exception of that portion lying in the unincorporated village of Clayville. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of local limestone and the top course 2 inches in thickness of Little Falls syenite. It is expected that the improvement of this road will be completed before the close of the present season.

MOHAWK RIVER ROAD, ROME, No. 560, ONEIDA COUNTY.

Length, 2.42 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $24,600.

Contract dated, September 19, 1907.

Work commenced, October 25, 1907.

Work completed, 99 per cent.

Contractors, Casey and Murray.

Engineer in charge, O. M. Severson.

This road extends from the westerly end of road No. 295 through that portion of the city of Rome outside of the corporation tax district to the inner corporation line. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of Little Falls syenite.

This road is completed but has not as yet been formally accepted.

ROME–NORTHWESTERN (SECTION 1) ROAD, No. 561, ONEIDA COUNTY.

Length, 4.48 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $57,400.

Contract dated, January 29, 1908.

Work commenced, April 10, 1908.

Work completed, 91 per cent.

Contractors, Brown and Lowe.

Engineers in charge, T. F. Nichols and Louis Garbi, Jr.

The original plans for this road provided for the improvement of that portion of the Rome–Northwestern road extending from the outer line of the city of Rome northerly through the villages of Westernville and Northwestern to the Mohawk river bridge north of Northwestern. The southerly portion of this highway, however, traverses the valley which it is proposed to flood by the Delta reservoir for the Barge canal. The plans were accordingly revised, the improvement of this portion of the road being cut out. This contract, therefore, provides for the improvement of that portion of the highway north of the flow line of the proposed reservoir. The macadam surface is 6 inches in thickness, the bottom course being 3 inches in thickness of local limestone and the top course 3 inches in thickness of Little Falls syenite.

It is expected that the improvement will be completed before the close of the present season.

ROME–NORTHWESTERN (SECTION 2) ROAD, NO. 562, ONEIDA COUNTY.

Length, 3.87 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,400.

Contract dated, January 29, 1908.

Work commenced, August 7, 1908.

Work completed, 4 per cent.

Contractors, Brown and Lowe.

Engineer in charge, O. M. Severson.

This road extends through the city of Rome from the inner corporation tax district to the outer city line, where it connects with road No. 561. The contract for the improvement of this road and also that for road No. 561 were awarded to the same con-

tractor. He does not purpose doing any more work on this contract during the present year than to construct the culverts and bridges.

ROME–TABERG ROAD, NO. 563, ONEIDA COUNTY.

Length, 5.11 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $60,350.

Contract dated, March 4, 1908.

Work commenced, May 18, 1908.

Work completed, 40 per cent.

Contractors, Hyde, Hyde and Edy.

Engineer in charge, O. M. Severson.

This road extends through the city of Rome, from the inner corporation tax district to the outer city line on the so-called Rome–Taberg road. The macadam surface is 6 inches in thickness, constructed in two courses, the bottom course being 3 inches in thickness of imported limestone and the top course 3 inches in thickness of Little Falls syenite.

It is not expected that the improvement of this road will be completed this season.

AUBURN–SENECA FALLS (SECTION 1) ROAD, NO. 590, CAYUGA COUNTY.

Length, 7.96 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $76,900.

Contract dated, November 10, 1906.

Work commenced, April 29, 1907.

Work completed, 97 per cent.

Contractor, The Scofield Company.

Engineers in charge, E. C. Clark and L. M. Cowen.

The contract for the improvement of this road was awarded to the Scofield Company of Philadelphia, Pa., who started the work early in the season of 1907. On or about the first of October, 1907, the Scofield Company went into the hands of a receiver and

the work closed down suddenly without any warning, leaving a large amount of macadam in an unfinished condition. After considerable delay this Department took charge of the work and expended $1,385.75 for the purchase of material and labor to complete into macadam the loose stone spread on the road and otherwise protect the work for the winter season. As the receivers did not make any effort to take up and complete the work, the State Engineer, after due notice thereof, advertised and awarded to Fred T. Ley and Co. Inc., a contract for the completion of the work contemplated in the Scofield Company's contract. The macadam surface is 6 inches in thickness, all of local limestone. The improvement of the road is now practically completed, but has not as yet been formally accepted.

MORAVIA–NILES ROAD, NO. 591, CAYUGA COUNTY.

Length, 10.85 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $89,800.

Contract dated, November 15, 1906.

Work commenced, April 8, 1907.

Work completed, 90 per cent.

Contractor, Jeremiah T. Finch.

Engineers in charge, A. L. Northrup and D. J. Fitzgerald.

This road extends northerly from the corporation line of the village of Moravia on the so-called Niles road to the Onondaga county line. The macadam surface is 6 inches in thickness, all of local limestone. It is expected that the improvement will be fully completed before the close of the present season.

AUBURN–ELBRIDGE ROAD, NO. 592, CAYUGA COUNTY.

Length, 5.61 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $55,400.

Contract dated, September 18, 1906.

Work commenced, April 15, 1907.

Work completed, 98 per cent.

Contractors, Chambers and Grady.

Engineers in charge, E. C. Clark and A. L. Sayer.

This road extends from the city line of Auburn easterly through the hamlet of Sennett to the Onondaga county line on the Genesee turnpike. The macadam surface is 6 inches in thickness, all of local limestone.

After the contract for the improvement of this road had been awarded the town authorities and the New York Central Railroad Company arranged to eliminate a grade crossing on this road about one mile west of Sennett. The contract was awarded to another contractor for the grade crossing elimination.

With the exception of the section of road covered by the viaduct and its approaches, the improvement was practically completed at the close of the season of 1907. The work was not accepted, pending the adjustment of the surfacing of the approaches after they had been completed by the railroad contractor. These approaches are now about completed and it is expected that the highway improvement contractor will proceed at once to place the wearing surface on the same, when the contract will be accepted.

HOMER–TULLY (SECTION 2) ROAD, NO. 595, CORTLAND COUNTY.

Length, 5.43 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $45,650.

Contract dated, December 4, 1907.

Work commenced, July 20, 1908.

Work completed, 48 per cent.

Contractors, Chambers and Grady.

Engineer in charge, E. A. Dahmen.

This road extends northerly from the north end of road No. 510, at the Homer–Preble town line, to the Onondaga county line south of the village of Tully. The macadam surface is 6 inches in thickness, all of local limestone.

Owing to the lateness of the season when the improvement of this road was started, it is not expected that the contract will be entirely completed this season.

NORWICH–SOUTH NEW BERLIN (SECTION 1) ROAD, NO. 596, CHENANGO COUNTY.

Length, 3.42 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $35,900.

Contract dated, September 20, 1907.

Work commenced, April 14, 1908.

Work completed, 78 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, E. H. Stewart.

This road extends easterly from the corporation line of the village of Norwich on the South New Berlin road to the New Berlin town line. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from Oriskany Falls.

It is expected that the improvement of this road will be completed before the close of the present season.

NORWICH–KINGS SETTLEMENT ROAD, NO. 597, CHENANGO COUNTY.

Length, 3.55 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $36,550.

Contract dated, October 22, 1907.

Work commenced, April 2, 1908.

Work completed, 95 per cent.

Contractor, Newport Construction Company.

Engineer in charge, H. W. Benkart.

This road extends from a junction of the Norwich–North Norwich road, No. 505, about three-quarters of a mile north of the corporation line of the village of Norwich, northeasterly on the road to Kings Settlement. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from Oriskany Falls.

The improvement of this road is practically completed, but has not as yet been formally accepted.

NORWICH–PRESTON ROAD, No. 598, CHENANGO COUNTY.

Length, 5.09 miles.

Width of macadam, 10 and 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $59,700.

Contract dated, December 14, 1907.

Work commenced, May 11, 1908.

Work completed, 65 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineers in charge, E. H. Stewart and T. F. Nichols.

This road extends from the corporation line of the village of Norwich westerly to the hamlet of Preston. The macadam surface is 8 inches in thickness of local fieldstone and quarried stone, which consists of the harder grades of Oneonta sandstone. It is expected that the improvement of this road will be completed before the close of the present season.

SMYRNA–OTSELIC ROAD, No. 599, CHENANGO COUNTY.

Length, 6.48 miles.

Width of macadam, 10 and 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $62,400.

Contract dated, February 4, 1908.

Work commenced, May 11, 1908.

Work completed, 34 per cent.

Contractor, Delaware Construction Company.

Engineer in charge, S. B. McDonald.

This road extends easterly from the corporation line of the village of Smyrna to the Sherburne town line, and westerly from the corporation line of the village of Smyrna to the hamlet of Bonney. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local quarried stone and the top course 2 inches in thickness of limestone. The top course which has been laid thus far has been imported from the Oriskany Falls quarries. It is ex-

pected, however, later to develop a local limestone quarry, from which to obtain the stone for the top course on the westerly end of the road.

It is not expected that the improvement of this road will be completed this season.

CAYUGA HEIGHTS–HANSHAW'S CORNERS ROAD, NO. 606, TOMPKINS COUNTY.

Length, 2.12 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $25,000.

Contract dated, September 20, 1907.

Work commenced, April 13, 1908.

Work completed, 83 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, R. E. Swinney.

This road extends northeasterly on a new location from a junction with road No. 336 to a junction with the road leading to the village of Aetna; thence easterly on said road to the four corners north of Forest Home. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of the better quality of the Ithaca shale, and the top course 2 inches in thickness of imported limestone from the Blakeslee quarries.

It is expected that the improvement of this road will be completed before the close of the present season.

AUBURN–OWASCO ROAD, NO. 614, CAYUGA COUNTY.

Length, 6.08 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $59,000.

Contract dated, September 20, 1907.

mmenced, May 22, 1908.

npleted, 56 per cent.

r, Stewart–Kerbaugh–Shanley Company.

in charge, H. G. Hotchkiss, Jr.

This road extends southerly from the southerly end of road No. 383 to and through the village of Owasco to the Onondaga county line. The macadam surface is 6 inches in thickness, all of local limestone. It is not expected that the improvement of this road will be completed before the close of the present season.

TRUMANSBURG–ITHACA ROAD, NO. 616, TOMPKINS COUNTY.

Length, 8.66 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $94,500.

Contract dated, September 20, 1907.

Work commenced, May 11, 1908.

Work completed, 73 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, J. B. Whipple.

This road extends northwesterly from the city line of Ithaca to the corporation line of the village of Trumansburg. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of imported limestone from the Le Roy quarries. It is expected that the improvement of this road will be completed before the close of the present season.

GRANBY ROAD, NO. 653, OSWEGO COUNTY.

Length, 5.06 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering $63,200.

Contract dated, December 18, 1907.

Work commenced, May 11, 1908.

Work completed, 64 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineers in charge, E. M. Babcock and A. H. Scheutzow.

This contract provides for the improvement of two sections of road in the town of Gramby, one section extending westerly from the Fulton city line to Bowens Corners, the other section extending southerly from the Fulton city line on the river road to Wilcox's

Corners. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course on the Bowens Corners section being 4 inches in thickness of crushed local fieldstone and on the Wilcox's Corners section 4 inches in thickness of imported limestone. The top course on both sections is 2 inches in thickness of Little Falls syenite. It is anticipated that the contract will be completed before the close of the present season.

CATO–MERIDIAN–BALDWINSVILLE ROAD, NO. 684, CAYUGA COUNTY.

Length, 4.40 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $59,400.

Contract dated, December 18, 1907.

Work commenced, April 15, 1908.

Work completed, 68 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, L. H. Marsland.

This road extends from the corporation line of the village of Meridian westerly to the corporation line of the village of Cato, and easterly from the corporation line of Meridian to the Onondaga county line on the road to Baldwinsville. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness of crushed local fieldstone and the top course 2 inches in thickness of Little Falls syenite. It is anticipated that the improvement of this road will be completed before the close of the present season.

CHITTENANGO–ONEIDA (SECTION 2) ROAD, NO. 726, MADISON COUNTY.

Length, 7.53 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $89,250.

Contract dated, February 11, 1908.

Work commenced, April 14, 1908.

Work completed, 69 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineers in charge, T. F. Nichols and J. F. Maher.

This road extends westerly from the corporation tax district of the city of Oneida, on Lenox avenue, to the Seneca turnpike; thence along the Seneca turnpike to the Sullivan town line; also including the continuation of Peterboro street in the village of Canastota from the corporation line of Canastota at the Seneca turnpike southerly to the Lincoln town line. The macadam surface is 6 inches in thickness, laid in two courses, the bottom course being 4 inches in thickness, of imported limestone from several commercial quarries and the top course 2 inches in thickness of Little Falls syenite. It is anticipated that the contract will be completed before the close of the present season.

OGDENSBURG–CANTON (SECTION 1) ROAD, NO. 732, ST. LAWRENCE COUNTY.

Length, 8.79 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $75,550.

Contract dated, April 23, 1908.

Work commenced, June 1, 1908.

Work completed, 45 per cent.

Contractors, Ryan and Yale.

Engineer in charge, Roy F. Hall.

This contract provides for the improvement of the westerly half of the Ogdensburg–Canton road. The macadam surface is 6 inches in thickness, all of local limestone. It is not expected that the entire contract will be completed this season.

OGDENSBURG–CANTON (SECTION 2) ROAD, NO. 733, ST. LAWRENCE COUNTY.

Length, 8.02 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $80,100.

Contract dated, April 23, 1908.

Work commenced, May 18, 1908.

Work completed, 46 per cent.

Contractors, Ryan and Yale.

Engineer in charge, F. H. Flint.

This contract provides for the improvement of the easterly half of the Ogdensurg–Canton road. The macadam surface is 6 inches in thickness of crushed local fieldstone, which consists chiefly of Adirondack gneiss with some granite, sandstone and limestone.

It is not anticipated that this contract will be completed before the close of the present season.

IMPROVEMENT OF PUBLIC HIGHWAYS.

Recapitulation of Work Done to September 30, 1908.

COUNTY.	Miles under contract during year ended Sept. 30, 1908.	Miles of plans and estimates completed prior to Sept. 30, 1907.	Miles of plans and estimates completed prior to Sept. 30, 1908.	Miles of plans and estimates completed during year ended Sept. 30, 1908.	Miles of surveys made during year ended Sept. 30, 1908.	Miles of contracts completed prior to Sept. 30, 1907.	Miles of contracts completed prior to Sept. 30, 1908.	Miles of contracts completed during year ended Sept. 30, 1908.
Broome	10.53	58.62	91.48	32.86	2.80	23.99	36.84	12.85
Cayuga	4.40	35.86	66.45	30.59	15.36	......	2.19	2.19
Chenango	15.12	78.19	101.01	22.82	7.41	21.09	25.69	4.60
Cortland	5.43	30.00	42.30	12.30	11.04	6.22	6.22	....
Jefferson	8.93	108 04	108.04	......	6.88	27.84	39.92	12.08
Lewis	......	12.64	12 64	......	34.87	......	......	....
Madison	7.53	20.68	29 49	8.81	7.10	......	2.18	2.18
Oneida	13.46	94.74	141.71	46.97	10.53	16.09	38.83	22.74
Onondaga	2 96	110.06	110.06	......	24.92	12.65	21.06	8.41
Oswego	9.14	35.42	40.58	5 16	32.64	0.48	9.63	9.15
St. Lawrence	16 81	47.67	75.71	28.04	9.74	......	......	....
Seneca	1.30	33.95	33.95	......	......	......	......	....
Tioga	......	......	13.65	13.65	14.04	......	......	....
Tompkins	......	25.64	43.03	17.39	44.14	1.87	5.53	3.66
Totals	95.61	691.51	910.10	218.59	221.47	110.23	188.09	77.86

ROADS FOR WHICH CONTRACTS HAVE BEEN MADE UNDER CHAPTER 115, LAWS OF 1898, FROM SEPTEMBER 30, 1907, TO SEPTEMBER 30, 1908.

Road No.	NAME OF ROAD.	County.	Petition No.	Date of contract.	Length in miles.	Width of macadam in feet.	Width of roadway in feet.	Cubic yards excavation per mile.	Kind of Stone. Bottom.	Kind of Stone. Top.	Per cent completed to October 1, 1908.	Engineer's estimate.
273	Seneca River road, North Side	Seneca	518k	Dec. 4, 1907	1.30	16	26-28	3,904	Limestone	Limestone	93	$17,850 00
291	Cemetery	Onondaga	456	Oct. 18, 1907	0.89	16	26	3,202	Limestone	Limestone	100	11,400 00
421	Conklin	Broome	353, 354, 366	Dec. 2, 1907	7.83	14	26	2,784	Fieldstone	Trap-rock	89	84,100 00
426	State, section 2	Jefferson	466	Mar. 23, 1908	4.05	12	24-26-28	3,210	Granite boul	Granite boulders	84	46,950 00
428	Watertown-Carthage, section 3	Jefferson	451	Dec. 18, 1907	4.88	12	24	1,650	Limestone	Limestone	75	34,400 00
445	Lisle-Center Lisle	Broome	463	Dec. 20, 1907	2.70	12	22-24-26	4,111	Fieldstone	Trap-rock	90	35,250 00
451	Minetto-Fulton	Oswego	1006	Jan. 14, 1908	1.99	12	22-24	5,779	Limestone	Trap-rock	....	24,300 00
488	Belle Isle	Onondaga	709	Oct. 18, 1907	2.07	12	26-28	2,058	Limestone	Limestone	67	17,800 00
539	Fulton-Volney	Oswego	769	Dec. 4, 1907	2.09	20	26	2,536	Gravel	Gravel	100	20,100 00
561	Rome-Northwestern, section 1	Oneida	319c	Jan. 29, 1908	4.48	16	26-28-30-	3,438	Limest'e and field-stone	Syenite	91	57,400 00
562	Rome-Northwestern, section 2	Oneida	1272	Jan. 29, 1908	3.87	16	24-28-30-32	3,437	Fieldstone	Syenite	4	41,400 00
563	Rome-Taberg	Oneida	1270	Mar. 4, 1908	5.11	16	24-26-28-30-32	3,024	Limestone	Syenite	40	60,350 00
595	Homer-Tully, section 2	Cortland	912f	Dec. 4, 1907	5.43	12	22-24-26-28-30	3,333	Limestone	Limestone	48	45,650 00
597	Norwich-Kings Settlement	Chenango	492, 771e	Oct. 22, 1907	3.55	12	24	3,197	Fieldstone	Limestone	95	36,550 00
598	Norwich-Preston	Chenango	494, 771r	Dec. 14, 1907	5.09	10-12	20-24	3,124	Local qua'y and field-stone	Local quarry and field stone	65	59,700 00
599	Smyrna-Otselic	Chenango	771y, 771z	Feb. 4, 1908	6.48	10-12	20-24	3,565	Local qu'ry stone	Limestone	34	62,400 00
653	Granby	Oswego	1,303, 1,419	Dec. 18, 1907	5.06	16	24-28	2,391	Lime'ne and field-stone	Syenite	64	63,200 00
684	Cato-Meridian-Baldwinsville	Cayuga	1,199, 1,200	Dec. 18, 1907	4.40	12	24	4,159	Fieldstone	Syenite	68	59,400 00
726	Chittenango-Oneida, section 2	Madison	1,317, 1,365, 1,384	Feb. 11, 1908	7.53	12-16	24-26-28	1,607	Limestone	Syenite	69	89,250 00
732	Ogdensburg-Canton, section 1	St. L'rence	1,068, 1,073	April 23, 1908	8.79	12	28	1,377	Limestone	Limestone	45	75,550 00
733	Ogdensburg-Canton, section 2	St. L'rence	1,063, 1,068	April 23, 1908	8.02	12	20-28	1,584	Gneiss and fi'ld st'ne	Gneiss and fi'ld stone	46	80,100 00

In conclusion, I desire to thank yourself and your deputies, Mr. W. R. Hill and Mr. Frank L. Getman, for uniform courtesy. I desire at this time also to express my sincere appreciation of the efficient service rendered by First Resident Engineer Fred W. Sarr, who has been untiring in his duties as my first assistant on road construction in this division.

I also desire to thank all the subordinates of the division for their faithful attention to the business of the Department.

Respectfully submitted,

HENRY B. BREWSTER,

Division Engineer.

THE FOLLOWING STATEMENTS SHOW THE NAMES, RANK AND COMPENSATION OF ENGINEERS EMPLOYED IN THE MIDDLE DIVISION OF THE DEPARTMENT OF THE STATE ENGINEER AND SURVEYOR, TOGETHER WITH INCIDENTAL EXPENSES FOR THE FISCAL YEAR ENDED SEPTEMBER 30, 1908.

Ordinary Repairs to Canals — Erie Canal.

Chapter 577, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
H. B. Brewster	Division engineer	$300 per month	$812 50	....	$812 50
Fred W. Sarr	First resident engineer	225 per month	1,200 00	$3.70	1,203 70
D. E. Whitford	Assistant engineer	6 00 per day	442 00	....	442 00
Edward M. Ellis	Assistant engineer	6 00 per day	335 00	20 45	355 45
D. C. Wedgeworth	Assistant engineer	6 00 per day	156 00	....	156 00
David R. Lee	Assistant engineer	6 00 per day	288 00	2 80	290 80
F. F. Miller	Assistant engineer	5 00 per day	130 00	....	130 00
J. Otis Burt	Assistant engineer	5 00 per day	30 00	6 45	36 45
Arthur G. Crysler	Assistant engineer	5 00 per day	5 00	3 10	8 10
Wm. S. Morris	Rodman	4 00 per day	580 00	....	580 00
I. H. Smallwood	Rodman	4 00 per day	56 00	....	56 00
F. H. Rawson	Draftsman	4 00 per day	104 00	....	104 00
L. A. MacSweeney	Inspector	4 50 per day	63 00	....	63 00
E. W. Parsons	Inspector	4 50 per day	117 00	....	117 00
C. H. Mattison	Inspector	3 50 per day	21 00	12 18	33 18
G. V. Purchase	Chainman	2 50 per day	255 00	....	255 00
Frank J. Kennedy	Financial clerk	5 00 per day	160 00	40	160 40
Peter Sheridan	Financial clerk	5 00 per day	175 00	6 25	181 25
Howard U. Lyon	Estimate clerk	150 per month	486 12	8 22	494 34
Harvey Wagner	Stenographer	100 per month	383 87	....	383 87
C. H. Morgan	Stenographer	100 per month	100 00	....	100 00
Seward Parker	Stenographer	75 per month	75 00	....	75 00
Clement Munger	Stenographer	75 per month	31 45	....	31 45
L. L. Watkins	Stenographer	75 per month	26 61	....	26 61
Florence Allen	Stenographer	3 00 per day	18 00	....	18 00
John Connors	Laborer	2 00 per day	628 00	....	628 00
Rudolph Beigel	Laborer	2 00 per day	314 00	....	314 00
Fred W. Harvey	Laborer	2 00 per day	2 00	....	2 00
J. D. Scanlon	Laborer	2 00 per day	50 00	....	50 00
Clark H. Norton	Laborer	2 00 per day	52 00	....	52 00
John Kelly	Laborer	2 00 per day	52 00	....	52 00
Henry Turk	Laborer	2 00 per day	52 00	....	52 00
					$7,264 10
Incidental Expenses.					
Livery				$9 50	
Stationery and printing				54 56	
Fuel and light				494 80	
Postage				190 00	
Telephone and telegraph				460 17	
Miscellaneous				526 87	
					1,735 90
Total					$9,000 00

Construction of Barge Canal — Erie Canal.

Chapter 147, Laws of 1903; Chapter 143, Laws of 1905; Chapter 172, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
H. B. Brewster	Division engineer	$300 per month	$887 50	$123 10	$1,010 60
Guy Moulton	Resident engineer	225 per month	2,691 74	226 48	2,918 22
W. H. Van Wie	Resident engineer	200 per month	2,200 00	499 39	2,699 39
Fred J. Wagner	Resident engineer	200 per month	2,224 00	366 87	2,590 87
Carl L. Bannister	Assistant engineer	6 00 per day	1,884 00	74 60	1,958 60
Louis A. Burns	Assistant engineer	6 00 per day	1,884 00	....	1,884 00
Daniel B. Donovan	Assistant engineer	6 00 per day	1,884 00	916 48	2,800 48
Arthur G. Crysler	Assistant engineer	6 00 per day	1,634 00	337 32	1,971 32
G. W. Stickney	Assistant engineer	6 00 per day	1,884 00	96 18	1,980 18
R. V. Collins	Assistant engineer	6 00 per day	54 00	51 55	105 55
D. C. Wedgeworth	Assistant engineer	6 00 per day	660 00	36 24	696 24
C. H. Rogers	Assistant engineer	5 00 per day	1,430 00	....	1,430 00
Louis Garbi, Jr	Assistant engineer	5 00 per day	475 00	260 05	735 05
Geo. H. Briggs	Assistant engineer	5 00 per day	705 00	523 85	1,228 85
W. A. Lafler	Assistant engineer	5 00 per day	1,464 50	194 23	1,658 73
Chas. W. Costello	Assistant engineer	5 00 per day	1,570 00	1,474 69	3,044 69
W. J. Durkan	Assistant engineer	5 00 per day	1,517 00	698 53	2,215 53
H. A. Gehring	Assistant engineer	5 00 per day	225 00	....	225 00
H. C. Smith	Assistant engineer	5 00 per day	510 00	....	510 00
P. F. McLellan	Assistant engineer	5 00 per day	465 00	....	465 00
F. J. Seery	Assistant engineer	5 00 per day	205 00	....	205 00
N. R. McLoud	Leveler	5 00 per day	1,570 00	104 98	1,674 98
Edward J. Berry	Leveler	5 00 per day	1,555 00	78 82	1,633 82
Charles Donohue	Leveler	4 50 per day	1,174 50	....	1,174 50
Frank H. Flint	Leveler	4 50 per day	36 00	....	36 00
Arch M. Snow	Leveler	4 50 per day	688 50	....	688 50
H. C. Smith	Leveler	4 50 per day	963 00	....	963 00
Foster B. Crocker	Leveler	4 50 per day	1,071 00	....	1,071 00
Vann R. Phillips	Leveler	4 50 per day	706 50	....	706 50
David J. Levinson	Leveler	4 50 per day	387 00	....	387 00
Geo. Yavroumis	Leveler	4 50 per day	445 50	....	445 50
Leland L. Graham	Leveler	4 50 per day	162 00	....	162 00
G. C. Ingersoll	Leveler	4 50 per day	391 50	....	391 50
Reed M. Cady	Leveler	4 50 per day	121 50	....	121 50
H. W. Benkart	Leveler	4 50 per day	90 00	....	90 00
Carl F. Hopstein	Draftsman	5 00 per day	1,491 50	268 36	1,759 86
Robt. K. Sheldon	Draftsman	5 00 per day	1,339 00	....	1,339 00
H. J. O'Neil	Draftsman	4 50 per day	418 50	....	418 50
R. M. Fraser	Draftsman	4 00 per day	1,256 00	....	1,256 00
Albert G. Card	Draftsman	4 00 per day	1,256 00	....	1,256 00
Wm. S. Morris	Rodman	4 00 per day	120 00	....	120 00
Geo. H. Thomas	Rodman	4 00 per day	516 00	....	516 00
I. H. Smallwood	Rodman	4 00 per day	156 00	....	156 00
Ralph M. Bennett	Rodman	3 50 per day	224 00	....	224 00
S. D. Hendricks	Rodman	3 50 per day	1,099 00	....	1,099 00
P. H. Budd	Rodman	3 50 per day	969 50	....	969 50
Joseph Mahar	Rodman	3 50 per day	31 50	....	31 50
Warren E. Darrow	Rodman	3 50 per day	143 50	....	143 50
Irwin S. Badger	Rodman	3 50 per day	507 50	....	507 50
Palmer C. Gallup	Rodman	3 50 per day	535 50	....	535 50
Reynold W. Smith	Rodman	3 50 per day	493 50	....	493 50
H. J. Stevens	Rodman	3 50 per day	458 50	....	458 50
R. G. Pratt	Rodman	3 50 per day	350 00	....	350 00
Jacob J. Schworn	Rodman	3 50 per day	154 00	....	154 00
Jerry P. Lynch	Rodman	3 50 per day	336 00	....	336 00
A. T. Madison	Rodman	3 50 per day	329 00	....	329 00
John A. Sloat	Rodman	3 50 per day	311 50	....	311 50
Henry C. Little	Chainman	3 00 per day	945 00	91 36	1,036 36
L. H. Rutherford	Chainman	2 50 per day	712 50	....	712 50
H. J. Stevens	Chainman	2 50 per day	375 00	....	375 00
Harry C. Smith	Chainman	2 50 per day	824 50	....	824 50
J. C. Rogers	Chainman	2 50 per day	350 00	....	350 00
M. H. Boigeol	Chainman	2 50 per day	385 00	....	385 00
F. H. Macy	Chainman	2 50 per day	242 50	....	242 50
E. E. Babcock	Chainman	2 50 per day	110 00	....	110 00
James L. Doyle	Chainman	2 50 per day	102 50	....	102 50
Henry A. Born	Chainman	2 50 per day	225 00	....	225 00
P. K. Lighthall	Chainman	2 50 per day	247 50	....	247 50
R. M. Fuller	Chainman	2 50 per day	262 50	....	262 50
G. V. Purchase	Chainman	2 50 per day	20 00	....	20 00
Byron T. Bisgood	Chainman	2 50 per day	95 00	....	95 00
LeRoy H. Wright	Chainman	2 50 per day	140 00	....	140 00

Construction of Barge Canal — Erie Canal — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
G. A Payne	Chainman	$2 50 per day	$45 00	....	$45 00
S. M. Stuart	Inspector	5 00 per day	634 00	....	634 00
C. H. Mattison	Inspector	4 50 per day	937 50	$114 66	1,052 16
A. G. Bohannan	Inspector	4 50 per day	684 00	69 47	753 47
Wm. J. Kelly	Inspector	4 00 per day	344 00	....	344 00
Edwin W. Parsons	Inspector	3 50 per day	17 50	8 58	26 08
H. J. Stevens	Inspector	3 50 per day	7 00	....	7 00
H. W. Stoneburg	Foreman of borings	3 50 per day	731 50	114 75	846 25
M. V. McCoy	Foreman of borings	3 50 per day	868 00	502 43	1,370 43
C. R. Judson	Foreman of borings	3 50 per day	185 50	9 72	195 22
Thomas B. Bowes	Foreman of borings	3 50 per day	234 50	29 48	263 98
John J. McManus	Foreman of borings	3 50 per day	229 50	15 96	245 46
Herman Kramer	Foreman of borings	3 50 per day	42 00	18 70	60 70
Peter Sheridan	Financial clerk	5 00 per day	40 00	....	40 00
Frank J. Kennedy	Financial clerk	5 00 per day	485 00	39 37	524 37
Howard U. Lyon	Estimate clerk	150 per month	627 76	6 81	634 57
Harvey Wagner	Stenographer	100 per month	350 00	....	350 00
Chas. H. Morgan	Stenographer	100 per month	100 00	....	100 00
Seward Parker	Stenographer	75 per month	33 87	....	33 87
L. Watkins	Stenographer	75 per month	75 00	....	75 00
W. H. Rundle	Boatman	3 00 per day	942 00	....	942 00
Victor S. Lewis	Boatman	3 00 per day	87 00	....	87 00
Oscar Svenson	Boatman	3 00 per day	942 00	....	942 00
James Keating	Boatman	3 00 per day	942 00	....	942 00
William Furman	Boatman	3 00 per day	192 00	....	192 00
William E. Barron	Axeman	2 00 per day	176 00	....	176 00
F. R. Schneller	Axeman	2 00 per day	210 00	....	210 00
L. G. Gollands	Axeman	2 00 per day	310 00	....	310 00
Howard W. Loftus	Axeman	2 00 per day	294 00	....	294 00
Warden T. Merriott	Axeman	2 00 per day	314 00	....	314 00
John J. Phalen	Axeman	2 00 per day	314 00	....	314 00
J. J. McLoud	Axeman	2 00 per day	48 00	....	48 00
Geo. E. Sweeting	Axeman	2 00 per day	262 00	....	262 00
John J. Gawkins	Axeman	2 00 per day	210 00	....	210 00
E. E. Neudecker	Axeman	2 00 per day	86 00	....	86 00
Lynn G. Gollands	Laborer	2 00 per day	96 00	....	96 00
David H. Doyle	Laborer	2 00 per day	574 00	....	574 00
Clarence Phelps	Laborer	2 00 per day	628 00	19 16	647 16
John W. Smith	Laborer	2 00 per day	566 00	....	566 00
Geo. E. Sweeting	Laborer	2 00 per day	366 00	....	366 00
D. J. McCarthy	Laborer	2 00 per day	256 00	....	256 00
John J. Gawkins	Laborer	2 00 per day	412 00	....	412 00
J. W. Main	Laborer	2 00 per day	576 00	50 07	626 07
W. T. Marriott	Laborer	2 00 per day	304 00	....	304 00
Jos. F. O'Brien	Laborer	2 00 per day	628 00	....	628 00
M. C. Plunkett	Laborer	2 00 per day	510 00	....	510 00
John J. Phalen	Laborer	2 00 per day	230 00	....	230 00
Wm. T. Kehoe	Laborer	2 00 per day	48 00	....	48 00
Bird D. Kneeland	Laborer	2 00 per day	444 00	....	444 00
Sylvester Willse	Laborer	2 00 per day	496 00	....	496 00
Fred W. Harvey	Laborer	2 00 per day	160 00	....	160 00
John L. Curtin	Laborer	2 00 per day	546 00	....	546 00
M. J. Finneran	Laborer	2 00 per day	134 00	....	134 00
Wm. R. Mahar	Laborer	2 00 per day	168 00	....	168 00
Joseph E. Quinn	Laborer	2 00 per day	626 00	....	626 00
J. W. Howard	Laborer	2 00 per day	576 00	....	576 00
D. Van Alstine	Laborer	2 00 per day	94 00	....	94 00
Washington Jones	Laborer	2 00 per day	176 00	....	176 00
Robert Cullen	Laborer	2 00 per day	48 00	....	48 00
Charles Parker	Laborer	2 00 per day	72 00	....	72 00
J. J. McLoud	Laborer	2 00 per day	180 00	....	180 00
E. Jones	Laborer	2 00 per day	52 00	....	52 00
Thomas Nugent	Laborer	2 00 per day	130 00	....	130 00
John Nugent	Laborer	2 00 per day	48 00	....	48 00
Edward Radford	Laborer	2 00 per day	88 00	....	88 00
James Ward	Laborer	2 00 per day	256 00	....	256 00
Frank Minor	Laborer	2 00 per day	10 00	....	10 00
Marvey Jones	Laborer	2 00 per day	356 00	....	356 00
Herbert E. Kane	Laborer	2 00 per day	10 00	....	10 00
Levi Odell	Laborer	2 00 per day	8 00	....	8 00
C. E. Tompkins	Laborer	2 00 per day	4 00	....	4 00
John P. Hughes	Laborer	2 00 per day	72 00	....	72 00
William Thomas	Laborer	2 00 per day	352 00	....	352 00
Fred Tetlock	Laborer	2 00 per day	122 00	....	122 00

Construction of Barge Canal — Erie Canal — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
W. G. Griffith	Laborer	$2 00 per day	$344 00	....	$344 00
Wesley Jaquish	Laborer	2 00 per day	306 00	....	306 00
J. J. Christian	Laborer	2 00 per day	58 00	....	58 00
Thomas Gaynor	Laborer	2 00 per day	440 00	....	440 00
James Mehegan	Laborer	2 00 per day	50 00	....	50 00
Thomas Gray	Laborer	2 00 per day	62 00	....	62 00
Joseph Griffin	Laborer	2 00 per day	90 00	....	90 00
John Kelly	Laborer	2 00 per day	208 00	....	208 00
Robt. W. Wilson	Laborer	2 00 per day	220 00	....	220 00
Donald Cameron	Laborer	2 00 per day	192 00	....	192 00
Walter Damon	Laborer	2 00 per day	18 00	....	18 00
John Cameron	Laborer	2 00 per day	12 00	....	12 00
C. C. Thomas	Laborer	2 00 per day	14 00	....	14 00
John Sheridan	Laborer	2 00 per day	102 00	....	102 00
Martin Malia	Laborer	2 00 per day	180 00	....	180 00
Walcott Farmer	Laborer	2 00 per day	176 00	....	176 00
Fred Tyre	Laborer	2 00 per day	172 00	....	172 00
Lawrence Menson	Laborer	2 00 per day	98 00	....	98 00
Eugene Reardon	Laborer	2 00 per day	170 00	....	170 00
George Lawler	Laborer	2 00 per day	95 00	....	95 00
Thomas Dunn	Laborer	2 00 per day	85 00	....	85 00
Frank Douglass	Laborer	2 00 per day	122 00	....	122 00
Daniel Goodwin	Laborer	2 00 per day	162 00	....	162 00
Bernard Murphy	Laborer	2 00 per day	162 00	....	162 00
Frank O'Brien	Laborer	2 00 per day	122 00	....	122 00
James E. Rowan	Laborer	2 00 per day	96 00	....	96 00
W. A. Shaw	Laborer	2 00 per day	84 00	....	84 00
Lee Derrick	Laborer	2 00 per day	90 00	....	90 00
Chas. Wimett	Laborer	2 00 per day	88 00	....	88 00
Joseph Buck	Laborer	2 00 per day	114 00	....	114 00
R. M. Gunnison	Laborer	2 00 per day	136 00	....	136 00
Joseph Duley	Laborer	2 00 per day	114 00	....	114 00
Charles Duley	Laborer	2 00 per day	110 00	....	110 00
Elmer Filkins	Laborer	2 00 per day	96 00	....	96 00
T. J. Kennedy	Laborer	2 00 per day	70 00	....	70 00
Ralph Bentley	Laborer	2 00 per day	44 00	....	44 00
George Grogan	Laborer	2 00 per day	90 00	....	90 00
Wm. G. Zeimann	Laborer	2 00 per day	44 00	....	44 00
Frank Teelin	Laborer	2 00 per day	44 00	....	44 00
John F. O'Brien	Laborer	2 00 per day	40 00	....	40 00
I. M. Schneible	Laborer	2 00 per day	44 00	....	44 00
Parson Derrick	Laborer	2 00 per day	56 00	....	56 00
Horace W. Haynes	Gage reader	10 per month	58 33	....	58 33
Chas. Brannock	Gage reader	10 per month	60 00	....	60 00
Louis McArthur	Gage reader	10 per month	120 00	....	120 00
W. B. Demsey	Gage reader	7 00 per month	84 00	....	84 00
C. B. Dunlop	Gage reader	7 00 per month	42 00	....	42 00
Marie Brandt	Gage reader	7 00 per month	84 00	....	84 00
Julius Albeck	Gage reader	7 00 per month	28 00	....	28 00
Karl Hatch	Gage reader	7 00 per month	84 00	....	84 00
Earl R. Williams	Gage reader	7 00 per month	21 00	....	21 00
Mrs. Augustus H. Hoffmeister	Gage reader	7 00 per month	84 00	....	84 00
Maria Powell	Gage reader	7 00 per month	84 00	....	84 00
W. T. Crill	Gage reader	7 00 per month	84 00	....	84 00
Fred Miller	Gage reader	7 00 per month	21 00	....	21 00
Daniel Brown	Gage reader	7 00 per month	84 00	....	84 00
Solomon Walts	Gage reader	7 00 per month	84 00	....	84 00
Griff G. Williams	Gage reader	7 00 per month	63 00	....	63 00
Melvin Smith	Gage reader	7 00 per month	63 00	....	63 00
Henry Straub	Gage reader	7 00 per month	42 00	....	42 00
John Carroll	Gage reader	7 00 per month	40 36	....	40 36
Lee McHenry	Gage reader	7 00 per month	11 43	....	11 43
L. P. Adsit	Gage reader	7 00 per month	10 62	....	10 62
Luke McHenry	Gage reader	7 00 per month	28 00	....	28 00
John Phillips	Gage reader	6 00 per month	72 00	....	72 00
E. A. Evans	Gage reader	5 00 per month	60 00	....	60 00
F. B. Randall	Gage reader	5 00 per month	45 00	....	45 00
Frank Shaw	Gage reader	5 00 per month	60 00	....	60 00
John Chamberlin	Gage reader	5 00 per month	60 00	....	60 00
Mark Kennedy	Gage reader	5 00 per month	60 00	....	60 00
Charles Bourke	Gage reader	5 00 per month	60 00	....	60 00
Adniram Hart	Gage reader	5 00 per month	60 00	....	60 00

Construction of Barge Canal — Erie Canal — (Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
W. M. Hubbard...	Gage reader	$5 00 per month	$60 00	....	$60 00
J. H. Rupert. ..	Gage reader........	5 00 per month	60 00	....	60 00
William Prettie ..	Gage reader........	5 00 per month	60 00	....	60 00
Mark Quimby...	Gage reader	5 00 per month	60 00	....	60 00
John P. Watts...	Gage reader........	5 00 per month	60 00	....	60 00
Frank Burns.....	Gage reader	5 00 per month	60 00	....	60 00
Ed. Jones.. ..	Gage reader.......	5 00 per month	60 00	... .	60 00
L. W. Moulton....	Gage reader	5 00 per month	45 00	....	45 00
Geo. W. Covell.	Gage reader	5 00 per month	15 00	....	15 00
Bessie C. Kellogg.	Gage reader.......	4 00 per month	25 47	....	25 47
					$170,463 02
	Incidental Expenses.				
Instruments and tools ...				$1,379 89	
Stationery and printing...				226 85	
Fuel and light...				623 18	
Postage...				198 05	
Office rent ...				734 50	
Telephone and telegraph...				340 32	
Miscellaneous...				9,487 69	
					12,990 48
Total...					$103,467 30

Construction of Barge Canal — Oswego Canal.

Chapter 147, Laws of 1903; Chapter 143, Laws of 1905; Chapter 172, Laws of 1907.

		Rate of compensation.	Services.	Travel.	Total.
Henry B. Brewster	Division engineer ..	$300 per month	$712 50	$19 83	$732 33
T. M. Ripley. ..	Resident engineer..	200 per month	2,200 00	237 59	2,437 59
Edwin Styring .	Resident engineer...	200 per month	2,362 00	24 51	2,386 51
D. D. Waldo. .	Resident engineer..	200 per month	200 00	15 90	215 90
Geo. I. Oakley ...	Assistant engineer..	6 00 per day	462 00	26 59	488 59
Geo. H. Haley ..	Assistant engineer..	6 00 per day	1,955 00	228 45	2,183 45
Arthur T. O'Leary	Assistant engineer..	6 00 per day	684 00	222 53	906 53
Jos. H. Young	Assistant engineer..	6 00 per day	672 00	48 51	720 51
Geo. H. Thomson	Assistant engineer..	6 00 per day	1,543 00	438 65	1,981 65
Geo. D. Kellogg	Assistant engineer..	5 00 per day	1,230 50	.....	1,230 50
Geo. C. Andrews	Assistant engineer..	5 00 per day	1,326 50	33 59	1,360 09
D. H. Judson....	Leveler.	4 50 per day	504 00	....	504 00
M. D. Ewell ...	Leveler	4 50 per day	1,123 00	....	1,123 00
R. W. Cady.....	Leveler	4 50 per day	920 00	....	920 00
G. C. Ingersoll .	Leveler	4 50 per day	404 00	....	404 00
H. H. Brown....	Leveler	4 50 per day	1,201 50	....	1,201 50
V. M. McConnell .	Draftsman.........	4 00 per day	1,096 00	... ...	1,096 00
H. A. J. Castor...	Draftsman	4 00 per day	664 00	....	664 00
Geo. E. Maynard.	Draftsman	4 00 per day	152 58	45 67	198 25
Harry W. Kehoe.	Draftsman.... ...	4 00 per day	248 00	....	248 00
Arthur T. Clark .	Draftsman.........	4 00 per day	120 00	.. ....	120 00
S. H. DePuy .	Draftsman	4 00 per day	44 00	....	44 00
A. W. Andrews ..	Draftsman	4 00 per day	1,134 00	. .....	1,134 00
Wm. S. Morris. .	Rodman.........	4 00 per day	272 00	....	272 00
W. C. R. Payne..	Rodman	3 50 per day	1,148 00	... .	1,148 00
E. A. Dollard..	Rodman	3 50 per day	308 00	....	308 00
J. J. Tehan......	Rodman	3 50 per day	262 50	....	262 50
C. E. Dunwoodie.	Rodman	3 50 per day	486 50	....	486 50
J. B. Whipple..	Rodman	3 50 per day	112 00	....	112 00
Ralph E. Drake...	Rodman.	3 50 per day	807 50	....	807 50
W. W. Moyer.....	Chainman.........	2 50 per day	210 00	28 02	238 02
Raymond C. Pugh	Chainman.........	2 50 per day	122 50	....	122 50
L. Y. Meneeley.	Chainman	2 50 per day	525 00	....	525 00

Construction of Barge Canal — Oswego Canal — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. H. Rutherford	Chainman	$2 50 per day	$67 50	....	$67 50
C. H. Mattison	Inspector	3 50 per day	146 50	$35 72	182 22
L. A. MacSweeney	Inspector	4 50 per day	58 50	....	58 50
W. N. Dutcher	Inspector	4 00 per day	1,280 00	....	1,280 00
W. A. Walters	Inspector	4 00 per day	1,084 00	....	1,084 00
E. W. Parsons	Inspector	4 50 per day	212 50	3 30	215 80
Wm. J. Kelly	Inspector	4 00 per day	276 00	....	276 00
Burt Hollenbeck	Inspector	4 00 per day	656 00	....	656 00
John E. Foote	Inspector	4 00 per day	12 00	....	12 00
H. W. Stoneburg	Foreman of borings	3 50 per day	224 00	198 10	422 10
M. V. McCoy	Foreman of borings	3 50 per day	234 50	54 78	289 28
Thos. B. Bowes	Foreman of borings	3 50 per day	98 00	57 58	155 58
H. E. Brainard	Bridge designer	175 per month	267 74	89 32	357 06
F. J. Kennedy	Financial clerk	5 00 per day	265 00	10 62	275 62
Peter Sheridan	Financial clerk	5 00 per day	70 00	....	70 00
Howard C. Lyon	Estimate clerk	150 per month	70 00	1 95	71 95
Harvey Wagner	Stenographer	100 per month	50 00	....	50 00
Leo Seigel	Stenographer	50 per month	150 00	....	150 00
Wm. Kelly	Boatman	3 00 per day	942 00	....	942 00
Thomas Redmond	Boatman	3 00 per day	951 00	....	951 00
A. Moosbrugger	Axeman	2 00 per day	596 00	....	596 00
William Graham	Axeman	2 00 per day	646 00	....	646 00
A. J. Brosnehan	Axeman	2 00 per day	440 00	....	440 00
James O'Gorman	Axeman	2 00 per day	192 00	....	192 00
F. W. Donovan	Axeman	2 00 per day	576 00	....	576 00
John Kelly	Laborer	2 00 per day	54 00	....	54 00
C. H. Henrick	Laborer	2 00 per day	18 00	....	18 00
Chas. Gallagher	Laborer	2 00 per day	110 00	....	110 00
J. W. Main	Laborer	2 00 per day	54 00	....	54 00
J. W. Howard	Laborer	2 00 per day	56 00	....	56 00
J. W. Smith	Laborer	2 00 per day	56 00	....	56 00
W. A. Shaw	Laborer	2 00 per day	32 00	....	32 00
Thomas Dunn	Laborer	2 00 per day	32 00	....	32 00
S. Willse	Laborer	2 00 per day	120 00	....	120 00
C. A. Porter	Laborer	2 00 per day	56 00	....	56 00
Emerson H. Fitch	Laborer	2 00 per day	74 00	....	74 00
M. C. Plunkett	Laborer	2 00 per day	120 00	....	120 00
James Mehegan	Laborer	2 00 per day	498 00	....	498 00
James Kenyon	Laborer	2 00 per day	652 00	....	652 00
Wm. T. Kehoe	Laborer	2 00 per day	46 00	....	46 00
B. D. Kneeland	Laborer	2 00 per day	134 00	....	134 00
Joseph Griffin	Laborer	2 00 per day	460 00	....	460 00
W. R. Mahar	Laborer	2 00 per day	44 00	....	44 00
Washington Jones	Laborer	2 00 per day	68 00	....	68 00
Thomas Nugent	Laborer	2 00 per day	34 00	....	34 00
John Braniff	Laborer	2 00 per day	20 00	....	20 00
Chas. Gallager	Laborer	2 00 per day	52 00	....	52 00
Thomas Gray	Laborer	2 00 per day	80 00	....	80 00
John Mott	Laborer	2 00 per day	64 00	....	64 00
Thomson & Bogardus	....	....	....	15 00	15 00
Roy L. Smith	Gage reader	5 00 per month	60 00	....	60 00
L. D. Sterling	Gage reader	5 00 per month	35 00	....	35 00
Frank M. Hughes	Gage reader	12 00 per month	144 00	....	144 00
Smith Sharp	Gage reader	5 00 per month	85 00	....	85 00
Geo. Archambo	Gage reader	6 00 per month	72 00	....	72 00
J. M. Johnson	Gage reader	5 00 per month	60 00	....	60 00
D. D. Tompkins	Gage reader	5 00 per month	60 00	....	60 00
Samuel L. Purdy	Gage reader	5 00 per month	60 00	....	60 00
					$40,124 03

Incidental Expenses.

Instruments and tools	$29 90	
Stationery and printing	75 68	
Fuel and light	193 97	
Postage	74 05	
Office rent	614 97	
Telephone and telegraph	200 88	
Miscellaneous	2,219 42	
		3,408 87
Total		$43,532 90

Improvement of Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Henry B. Brewster	Division engineer	$3,600 per year	$1,187 50	$590 40	$1,777 90
Fred W. Barr	1st resident engineer	225 per month	1,300 00	465 72	1,765 72
Herbert Spencer	Resident engineer	200 per month	600 00	111 72	711 72
Geo. R. Winslow	Resident engineer	200 per month	2,362 00	273 86	2,635 86
H. E Smith	Resident engineer	200 per month	2,200 00	104 25	2,304 25
R. J. Marcher	Resident engineer	200 per month	1,948 39	318 53	2,266 92
L. C. Hulburd	Resident engineer	200 per month	1,400 00	128 61	1,528 61
Guy H. Miller	1st asst engineer	7 00 per day	1,148 00	195 08	1,343 08
F. S. Strong	Assistant engineer	6 00 per day	2,004 00	942 56	2,946 56
S. J Stewart	Assistant engineer	6 00 per day	2,142 00	465 25	2,607 25
J N Slater	Assistant engineer	6 00 per day	1,968 00	549 96	2,517 96
Nathan E Young	Assistant engineer	6 00 per day	1,974 00	194 49	2,168 49
Harvey F Hawley	Assistant engineer	6 00 per day	1,884 00		1,884 00
J Otis Burt	Assistant engineer	6 00 per day	1,760 00	181 26	1,941 26
D. E. Whitford	Assistant engineer	6 00 per day	936 00		936 00
Louis Garbi, Jr	Assistant engineer	6 00 per day	1,310 00	148 56	1,458 56
Frank W. Bristow	Assistant engineer	6 00 per day	1,146 00	112 53	1,258 53
E. C Clark	Assistant engineer	6 00 per day	1,440 00	93 87	1,533 87
T. F Nichols	Assistant engineer	6 00 per day	1,932 00	764 50	2,696 50
David R. Lee	Assistant engineer	6 00 per day	942 00	621 07	1,563 07
O. M. Severson	Assistant engineer	6 00 per day	1,932 00	986 53	2,918 53
Harry H Greene	Assistant engineer	6 00 per day	120 00	4 70	124 70
Joseph P Burns	Assistant engineer	6 00 per day	1,523 00	119 63	1,642 63
F F Miller	Assistant engineer	6 00 per day	1,494 00	93 37	1,587 37
L. D. Brownell	Assistant engineer	6 00 per day	1,596 00	127 83	1,723 83
R. V Collins	Assistant engineer	6 00 per day	1,849 00	887 79	2,736 79
A. L. Northrup	Assistant engineer	6 00 per day	1,680 00	573 93	2,253 93
Wm. H Snyder	Assistant engineer	6 00 per day	1,902 00	290 00	2,192 00
E. H. Stewart	Assistant engineer	6 00 per day	1,965 00	500 31	2,465 31
C. J. Myers	Assistant engineer	6 00 per day	1,863 00	88 35	1,951 35
S. B. McDonald	Assistant engineer	5 00 per day	1,075 00	79 31	1,154 31
C H Rogers	Assistant engineer	5 00 per day	150 00	187 17	337 17
T. D Ringwood	Assistant engineer	5 00 per day	1,575 00	42 10	1,617 10
Geo H. Thompson	Assistant engineer	5 00 per day	245 00	4 80	249 80
Edward M Ellis	Assistant engineer	5 00 per day	260 00	5 60	265 60
Albert L Sayer	Assistnat engineer	5 00 per day	1,451 50	453 25	1,904 75
R. P McClave	Assistant engineer	5 00 per day	225 00	4 00	229 00
A. T O'Leary	Assistant engineer	5 00 per day	24 00		24 00
R. E. Miller	Assistant engineer	5 00 per day	500 00	10 60	510 60
R. B Hoadley, Jr	Assistant engineer	5 00 per day	495 00	8 25	503 25
David R. Cooper	Assistant engineer	5 00 per day	260 00	45 75	305 75
George F Hall	Assistant engineer	5 00 per day	601 50	13 10	614 60
J G. Palmer	Assistant engineer	5 00 per day	610 00	11 83	621 83
C. E. C. Harris	Assistant engineer	5 00 per day	480 00	29 45	509 45
James Dollard	Assistant engineer	5 00 per day	465 00		465 00
C. D. Murray	Assistant engineer	5 00 per day	550 00	6 20	556 20
Geo. W. Bradley	Assistant engineer	5 00 per day	490 00	83 72	573 72
T. M Witbeck	Assistant engineer	5 00 per day	500 00		500 00
L. H Marsland	Assistant engineer	5 00 per day	520 00		520 00
H. R Starbird	Assistant engineer	5 00 per day	397 50	437 90	835 40
A. F. Armstrong	Assistant engineer	5 00 per day	305 00	33 11	338 11
J. M. Howard	Assistant engineer	5 00 per day	1,000 00	191 40	1,191 40
Frank C Tolles	Assistant engineer	5 00 per day	1,507 50	67 49	1,574 99
W W Ewell	Leveler	4 50 per day	1,417 50	74 58	1,492 08
Edward M. Babcock	Leveler	4 50 per day	1,273 50	59 20	1,332 70
C D. Murray	Leveler	4 50 per day	894 50	198 38	1,092 88
Chas. C. Cassell	Leveler	4 50 per day	661 50	14 95	676 45
R. E. Swinney	Leveler	4 50 per day	688 50	78 89	767 39
Geo. C Andrews	Leveler	4 50 per day	198 00		198 00
Louis Oppenheim	Leveler	4 50 per day	1,422 00	2 10	1,424 10
Jas. T. Schuyler	Leveler	4 50 per day	360 00	37 49	397 49
Smith O'Steere	Leveler	4 50 per day	427 50	3 10	430 60
E. A Dahmen	Leveler	4 50 per day	1,444 50	68 84	1,513 34
J. M. Howard	Leveler	4 50 per day	522 00	8 18	530 18
S. B. McDonald	Leveler	4 50 per day	490 50	4 70	495 20
R. E Miller	Leveler	4 50 per day	967 50	231 70	1,199 20
G. W. Bradley	Leveler	4 50 per day	1,025 50	230 10	1,255 60
Geo. Yavroumis	Leveler	4 50 per day	967 50	41 00	1,008 50
H. W. Benkart	Leveler	4 50 per day	490 50		490 50
Burtis J Finch	Leveler	4 50 per day	423 00	19 90	442 90
R M. Bennett	Leveler	4 50 per day	315 00	......	315 00

Improvement of Public Highways—(Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
...in.	L	$4 50 per day	$418 50	....	$418 50
...on	L	4 50 per day	414 00	......	414 00
..	L	4 50 per day	481 50	$22 93	504 43
..	L	4 50 per day	418 50	.....	418 50
.	L	4 50 per day	414 00	13 84	427 84
	L	4 50 per day	157 50	....	157 50
	L	4 50 per day	315 00	....	315 00
	L	4 50 per day	706 50	......	706 50
	L	4 50 per day	130 50	12 50	143 00
...	L	4 50 per day	108 00	9 10	117 10
,	B	175 per month	1,106 45	133 72	1,240 17
...on	I	4 00 per day	900 00	....	900 00
...ll	I	4 00 per day	164 00	.....	164 00
...l	I	4 00 per day	916 00	....	916 00
C. F. DeClercq	I	4 00 per day	752 50	4 48	756 98
Vann R. Phillips	I	4 00 per day	32 00	......	32 00
Ward J. Hager	I	4 00 per day	672 00	......	672 00
S. M. Witbeck	I	4 00 per day	260 00	......	260 00
S. H. DePuy	I	4 00 per day	656 00	.....	656 00
H. B. Hoyt	Draftsman	4 00 per day	348 00	..	348 00
L. Lee Hadley	Draftsman	4 00 per day	316 00	......	316 00
Forest H. Rawson	Draftsman	4 00 yer day	284 00	.....	284 00
A. E. Upson	Tracer	50 per month	280 00	...	280 00
Joseph F. Maher	Rodman	4 00 per day	1,228 50	91 64	1,320 14
F. A. Gordon	Rodman	4 00 per day	1,163 50	13 20	1,176 70
W. S. Morris	Rodman	4 00 per day	396 00	.	396 00
Geo. C. Hannon	Rodman	4 00 per day	1,173 50	13 15	1,186 65
Harry N. Haight	Rodman	4 00 per day	908 00	51 03	959 03
Geo. H. Thomas	Rodman	4 00 per day	648 00	34 69	682 69
Jacob A. Erhardt	Rodman	3 50 per day	625 92	2 07	627 99
John D. Rust	Rodman	3 50 per day	500 50	.....	500 50
Benjamin Taylor	Rodman	3 50 per day	493 50	......	493 50
R. D. Wiswell	Rodman	3 50 per day	546 00	..	546 00
E. C. Dollard	Rodman	3 50 per day	504 00	...	504 00
S. Breitheimer	Rodman	3 50 per day	430 50	4 90	435 40
A. B. Cudebec	Rodman	3 50 per day	423 50	12 35	435 85
B. J. Finch	Rodman	3 50 per day	780 50	10 70	791 20
I. H. Smallwood	Rodman	3 50 per day	220 50	....	220 50
R. E. Swinney	Rodman	3 50 per day	371 00	46 10	417 10
M. D. Ewell	Rodman	3 50 per day	133 00	6 25	139 25
C. E. Dunwoodie	Rodman	3 50 per day	210 00	...	210 00
Geo. H. Rekate	Rodman	3 50 per day	483 00	....	483 00
Reed W. Cady	Rodman	3 50 per day	[illegible] 00	5 78	156 28
R. M. Bennett	Rodman	3 50 per day	560 00	......	560 00
J. B. Whipple	Rodman	3 50 per day	259 00	23 30	282 30
D. W. Chamberlin	Rodman	3 50 per day	203 00	......	203 00
E. De V. Kelly	Rodman	3 50 per day	472 50	1 83	474 33
A. T. Madison	Rodman	3 50 per day	143 50	35	143 85
Leigh Roberts	Rodman	3 50 per day	273 00		273 00
W. C. Slayton	Rodman	3 50 per day	283 50	..	283 50
Lynn T. Farnham	Rodman	3 50 per day	406 00	....	406 00
Amasa Stewart	Rodman	3 50 per day	332 50		332 50
W. C. House	Rodman	3 50 per day	161 00	11 15	172 15
H. J. Stabile	Rodman	3 50 per day	336 00	..	336 00
A. M. Zoill	Rodman	3 50 per day	332 50	..	332 50
W. F. Shaw	Rodman	3 50 per day	346 50	..	346 50
W. P. Nichols	Rodman	3 50 per day	290 50	....	290 50
Geo. W. Wright	Rodman	3 50 per day	367 50	..	367 50
W. A. Spellman	Rodman	3 50 per day	353 50	..	353 50
P. H. Budd	Rodman	3 50 per day	136 50	....	136 50
Frank Lutz	Chainman	3 00 per day	942 00		942 00
D. W. Scripture	Chainman	3 00 per day	954 00	19 13	973 13
R. B. Graham	Chainman	3 00 per day	857 50	9 70	867 20
L. Kavanaugh	Chainman	3 00 per day	969 00	....	969 00
D. A. Wilcox	Chainman	2 50 per day	350 00	.	350 00
Raymond C. Pugh	Chainman	2 50 per day	585 00	28 61	613 61
T. M. Lawrence	Chainman	2 50 per day	583 00	6 67	589 67
Fred. M. Teel	Chainman	2 50 per day	322 50	2 85	325 35
John J. Coleman	Chainman	2 50 per day	447 50	.....	337 50
James Adams	Chainman	2 50 per day	367 50	....	367 50
C. A. Payne	Chainman	2 50 per day	320 00	......	320 00
Paul Ryan	Chainman	2 50 per day	380 00	......	380 00
N. H. Whittemore	Chainman	2 50 per day	340 00	....	340 00
Wm. H. Carnrike	Chainman	2 50 per day	382 50	......	382 50

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total
C. H. Vandenburg	Chainman	$2 50 per day	$262 50		$262 50
J. T. Crawford	Chainman	2 50 per day	310 00		310 00
G. V. Purchase	Chainman	2 50 per day	102 50		102 50
Alfred M. Sutber	Chainman	2 50 per day	15 00		15 00
P. K. Lighthall	Chainman	2 50 per day	15 00		15 00
LeRoy H. Wright	Chainman	2 50 per day	30 00		30 00
A. E. Aldrich	Chainman	2 50 per day	210 00		210 00
E. J. Clark	Chainman	2 50 per day	115 00		115 00
E. E. Babcock	Chainman	2 50 per day	130 00		130 00
H. J. Stevens	Chainman	2 50 per day	93 00	$7 46	100 46
L. H. Rutherford	Chainman	2 50 per day	10 00	2 08	12 08
L. A. MacSweeney	Inspector	4 50 per day	819 00	45 16	864 16
John Duignan	Inspector	4 50 per day	1,374 00		1,374 00
E. W. Parsons	Inspector	4 50 per day	1,036 50	24 46	1,060 96
A. W. Rogers	Inspector	4 50 per day	648 00	2 50	650 50
C. R. Madden	Inspector	4 50 per day	1,367 00	11 82	1,378 82
J. G. Wynkoop	Inspector	3 50 per day	1,099 00	4 15	1,103 15
Geo. J. Goehl	Inspector	3 50 per day	1,106 00	49 07	1,155 07
D. B. Stitt	Inspector	3 50 per day	819 00	52	819 52
A. H. Hollenbeck	Inspector	3 50 per day	353 50		353 50
B. F. Bauder	Inspector	3 50 per day	21 00		21 00
W. E. McNasser	Inspector	4 00 per day	1,292 00	106 82	1,398 82
S. A. Patterson	Inspector	3 50 per day	1,123 50	19 68	1,143 18
E. A. Dalton	Inspector	3 50 per day	542 50		542 50
F. H. Mongin	Inspector	3 50 per day	1,120 00	8 71	1,128 71
W. W. Bancroft	Inspector	3 50 per day	241 50		241 50
W. J. O'Brien	Inspector	3 50 per day	213 50		213 50
Burt D. Isenhour	Inspector	3 50 per day	469 00	15 43	484 43
A. M. McEneny	Inspector	3 50 per day	462 00		462 00
P. J. Murphy	Inspector	3 50 per day	7 00		7 00
D. B. Willson	Inspector	3 50 per day	206 50		206 50
T. M. Lawrence	Inspector	3 50 per day	364 00		364 00
C. H. Mattison	Inspector	3 50 per day	66 00	34 64	100 64
W. J. Wilds	Inspector	3 50 per day	731 50		731 50
Grant A. Tibbels	Inspector	3 50 per day	17 50		17 50
Harry L. Whitney	Inspector	3 50 per day	10 50		10 50
R. G. Pellett	Inspector	3 50 per day	514 50		514 50
H. G. Hotchkiss	Inspector	3 50 per day	560 00		560 00
D. R. Thornton	Inspector	3 50 per day	539 00		539 00
Don A. Wilcox	Inspector	3 50 per day	385 00		385 00
A. H. Emerson	Inspector	3 50 per day	290 50		290 50
C. W. Johnson	Inspector	3 50 per day	528 50	1 95	530 45
W. E. Barron	Inspector	3 50 per day	518 00		518 00
Geo. F. Wilcox	Inspector	3 50 per day	549 50		549 50
A. J. Adams	Inspector	3 50 per day	535 50		535 50
James J. Keenan	Inspector	3 50 per day	553 00		553 00
L. M. Cowen	Inspector	3 50 per day	556 50		556 50
D. J. Fitzgerald	Inspector	3 50 per day	1,165 50	4 50	1,170 00
B. A. Reddington	Inspector	3 50 per day	1,123 50	1 38	1,124 88
M. D. Poulsen	Inspector	3 50 per day	817 00	35 50	852 50
C. H. Roberts	Inspector	3 50 per day	1,074 50	140 09	1,214 59
A. H. Scheutzow	Inspector	3 50 per day	1,120 00		1,120 00
Geo. F. Hall	Inspector	3 50 per day	31 50		31 50
Peter Sheridan	Financial clerk	5 00 per day	95 00	1 00	96 00
Frank J. Kennedy	Financial clerk	5 00 per day	540 00	53 72	593 72
Howard U. Lyon	Estimate clerk	1,600 per year	461 12		461 12
C. H. Morgan	Stenographer	100 per month	1,000 00		1,000 00
Harvey Wagner	Stenographer	100 per month	100 00		100 00
Lincoln Watkins	Stenographer	75 per month	209 48		209 48
Seward Parker	Stenographer	75 per month	75 00		75 00
L. M. Cowen	Axeman	2 00 per day	340 00		340 00
Thos. F. Keating	Axeman	2 00 per day	286 00		286 00
Howard B. Lincoln	Axeman	2 00 per day	135 00		135 00
John C. Mitchell	Axeman	2 00 per day	272 00		272 00
Robt. Cameron	Axeman	2 00 per day	200 00		200 00
James Daly	Axeman	2 00 per day	282 00		282 00
Jay K. Smith	Axeman	2 00 per day	282 00		282 00
Ray F. Mott	Axeman	2 00 per day	294 00		294 00
J. C. O. Heckles	Axeman	2 00 per day	198 00		198 00
S. A. Miller	Axeman	2 00 per day	60 00		60 00
James A. Beeman	Axeman	2 00 per day	272 00		272 00
H. L. Lembeck	Axeman	2 00 per day	316 00	11 55	327 55
Hugh J. O'Brien	Axeman	2 00 per day	308 00	12 15	320 15
Fred. Hempel	Axeman	2 00 per day	12 00		12 00

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
L. F. Hichman	Axeman	$2 00 per day	$52 00		$52 00
D. Devorsak	Axeman	2 00 per day	208 00		208 00
G. H. Armstrong	Axeman	2 00 per day	284 00		284 00
Frank Layburn	Axeman	2 00 per day	334 00		334 00
F. J. O'Neil	Axeman	2 00 per day	306 00		306 00
A. M. Kelly	Axeman	2 00 per day	270 00		270 00
C. H. Henrick	Axeman	2 00 per day	250 00		250 00
R. E. Gallivan	Axeman	2 00 per day	644 00	$3 10	647 10
H. K. Donnelly	Axeman	2 00 per day	274 00		274 00
Thomas F. Gray	Axeman	2 00 per day	266 00	1 01	267 01
Warren Luther	Axeman	2 00 per day	274 00		274 00
J. H. Wallace	Axeman	2 00 per day	270 00		270 00
J. R. Curtin	Axeman	2 00 per day	234 00		234 00
C. I. Stratton	Axeman	2 00 per day	268 00		268 00
Ray Gorton	Axeman	2 00 per day	270 00		270 00
Roy Ames	Axeman	2 00 per day	196 00		196 00
M. W. Hughes	Axeman	2 00 per day	242 00		242 00
Louis Heinemann	Axeman	2 00 per day	266 00		266 00
C. J. Delaney	Axeman	2 00 per day	302 00		302 00
B. J. Reilley	Axeman	2 00 per day	272 00		272 00
J. E. Snyder	Axeman	2 00 per day	282 00		282 00
R. T. Kelly	Axeman	2 00 per day	286 00		286 00
F. J. Gehan	Axeman	2 00 per day	262 00		262 00
John A. Palmer	Axeman	2 00 per day	266 00		266 00
Fred. W. Harvey	Axeman	2 00 per day	264 00		264 00
Emerson Fitch	Axeman	2 00 per day	272 00		272 00
Fred. M. Cronin	Axeman	2 00 per day	266 00		266 00
Peter J. Blake	Axeman	2 00 per day	262 00		262 00
C. R. McEllen	Axeman	2 00 per day	260 00		260 00
D. C. Howard	Axeman	2 00 per day	52 00		52 00
W. R. Eggleston	Axeman	2 00 per day	264 00		264 00
C. A. Porter	Axeman	2 00 per day	266 00	15 10	281 10
E. Dowdle	Axeman	2 00 per day	172 00		172 00
L. H. Willson	Axeman	2 00 per day	126 00		126 00
E. F. Lindsay	Axeman	2 00 per day	210 00		210 00
John W. Davin	Axeman	2 00 per day	192 00	15 45	207 45
M. J. Finneran	Axeman	2 00 per day	218 00		218 00
H. W. Henderson	Axeman	2 00 per day	140 00		140 00
E. W. Kingston	Axeman	2 00 per day	194 00		194 00
John J. Carroll	Axeman	2 00 per day	172 00		172 00
H. J. Haley	Axeman	2 00 per day	134 00		134 00
L. S. Edwards	Axeman	2 00 per day	120 00		120 00
W. J. Carey	Axeman	2 00 per day	276 00		276 00
Charles Abel	Laborer	2 00 per day	644 00	358 28	1,002 28
Frank J. Lynch	Laborer	2 00 per day	70 00		70 00
Solomon Bloom	Laborer	2 00 per day	70 00		70 00
H. K. Donnelly	Laborer	2 00 per day	366 00		366 00
John H. Kelley	Laborer	2 00 per day	60 00		60 00
James A. Doyle	Laborer	2 00 per day	212 00		212 00
Geo. L. Stevens	Laborer	2 00 per day	26 00		26 00
John J. Maloney	Laborer	2 00 per day	6 00		6 00
Clark H. Norton	Laborer	2 00 per day	582 00		582 00
J. H. Mullaley	Laborer	2 00 per day	222 00		222 00
Henry Turk	Laborer	2 00 per day	564 00		564 00
Michael O'Toole	Laborer	2 00 per day	70 00		70 00
Robert Wilcox	Laborer	2 00 per day	70 00		70 00
John W. Davin, Jr.	Laborer	2 00 per day	314 00		314 00
Chas. E. Kearney	Laborer	2 00 per day	70 00		70 00
A. J. McPherson	Laborer	2 00 per day	54 00		54 00
Thos. F. Gray	Laborer	2 00 per day	212 00		212 00
Timothy Donovan	Laborer	2 00 per day	54 00		54 00
Fred. M. Cronin	Laborer	2 00 per day	370 00		370 00
T. S. Edwards	Laborer	2 00 per day	366 00		366 00
Thomas Dolan	Laborer	2 00 per day	70 00		70 00
Louis Heinemann	Laborer	2 00 per day	370 00		370 00
Frank D. Griffin	Laborer	2 00 per day	634 00		634 00
J. W. Baker	Laborer	2 00 per day	82 00		82 00
Charles Delaney	Laborer	2 00 per day	376 00		376 00
Blynn H. Buell	Laborer	2 00 per day	70 00		70 00
Wm. R. Curley	Laborer	2 00 per day	500 00		500 00
John S. Tracy	Laborer	2 00 per day	92 00		92 00
C. I. Stratton	Laborer	2 00 per day	376 00		376 00
B. J. Reilly	Laborer	2 00 per day	370 00		370 00
Warren Luther	Laborer	2 00 per day	366 00	60	366 60

Improvement of Public Highways — (Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
D. McCarthy	Laborer	$2 00 per day	$352 00		$352 00
Carl Dillenbeck	Laborer	2 00 per day	134 00		134 00
J. H. Wallace	Laborer	2 00 per day	368 00		368 00
F. M. Hazard	Laborer	2 00 per day	70 00		70 00
John Fitzgerald	Laborer	2 00 per day	80 00		80 00
C. A. Armstrong	Laborer	2 00 per day	106 00		106 00
Chas. R. McEllen	Laborer	2 00 per day	362 00	$2 20	364 20
D. C. Howard	Laborer	2 00 per day	354 00		354 00
Charles Hike	Laborer	2 00 per day	658 00		658 00
S. M. Stuart	Laborer	2 00 per day	330 00		330 00
Walter Eggleston	Laborer	2 00 per day	148 00	1 82	149 82
Edward Golden	Laborer	2 00 per day	54 00		54 00
Wm. P. Rayland	Laborer	2 00 per day	70 00		70 00
Peter Blake	Laborer	2 00 per day	372 00		372 00
Thomas Kennedy	Laborer	2 00 per day	78 00		78 00
Wm. C. Miller	Laborer	2 00 per day	76 00		76 00
Wm. E. Barron	Laborer	2 00 per day	160 00		160 00
R. Kelly	Laborer	2 00 per day	230 00		230 00
J. E. Snyder	Laborer	2 00 per day	266 00		266 00
C. A. Porter	Laborer	2 00 per day	84 00		84 00
Emerson Fitch	Laborer	2 00 per day	68 00		68 00
Fred W. Harvey	Laborer	2 00 per day	216 00		216 00
J. H. Klock	Laborer	2 00 per day	98 00		98 00
Roy W. Ames	Laborer	2 00 per day	120 00		120 00
T. R. Gorton	Laborer	2 00 per day	142 00		142 00
M. J. Cary	Laborer	2 00 per day	194 00		194 00
J. J. Phalen	Laborer	2 00 per day	84 00		84 00
W. Marrott	Laborer	2 00 per day	22 00		22 00
Rudolph Beigel	Laborer	2 00 per day	208 00		208 00
John H. Donovan	Laborer	2 00 per day	300 00		300 00
Francis Holleran	Laborer	2 00 per day	240 00		240 00
James B. Hill	Laborer	2 00 per day	252 00		252 00
H. W. Giles	Laborer	2 00 per day	168 00	16 98	184 98
Lee McHenry	Laborer	2 00 per day	136 00		136 00
John Sheridan	Laborer	2 00 per day	144 00		144 00
William Kirk	Laborer	2 00 per day	86 00		86 00
George Crowe	Laborer	2 00 per day	86 00		86 00
Carlisle Pontius	Laborer	2 00 per day	110 00		110 00
Frank L. Ryan	Laborer	2 00 per day	76 00		76 00
Martin Finneran	Laborer	2 00 per day	284 00		284 00
					$183,078 81

Incidental Expenses.

Livery	$9,581 96	
Stationery and printing	296 56	
Fuel and light	197 36	
Postage	360 73	
Office rent	1,864 03	
Telephone and telegraph	967 41	
Miscellaneous	8,918 14	
		22,186 19
Total		$205,265 00

Maintenance and Repairs of Improved Public Highways.

Chapter 115, Laws of 1898; Chapter 468, Laws of 1906; Chapter 683, Laws of 1906.

Road No.	NAME OF ROAD.	Town.	County.	Amount.
47	Chenango River	Chenango and Dickinson	Broome	$3,324 07
125	Lestershire	Union	Broome	3,014 90
126	Town Line Extension	Chenango	Broome	498 64
127	Park Bridge	Kirkwood	Broome	628 17
134	Fenton	Fenton	Broome	326 68
174	Endicott	Union	Broome	591 82
175	Chenango Tow Path	Fenton	Broome	260 47
209	Nineveh	Colesville	Broome	539 78
210	Harpersville	Colesville	Broome	68 26
212	Ouaquaga	Colesville	Broome	61 75
213	River road, Windsor, section 2	Windsor	Broome	46 33
214	River road, Windsor, section 1	Windsor	Broome	44 25
268	Chenango Bridge	Chenango	Broome	326 67
274	Gulf Bridge	Chenango	Broome	69 77
375	Barker	Barker	Broome	28 71
383	Owasco	Owasco	Cayuga	3,736 24
112	Norwich-Plymouth	Norwich and Plymouth	Chenango	705 87
218	Greene Smithville Flats	Greene and Smithville	Chenango	2,838 26
224	Oxford McDonough	Oxford, Preston and McDonough	Chenango	240 57
225	Guilford	Guilford	Chenango	339 36
40	Cuyler	Truxton	Cortland	211 71
111	Blodgett's Mills	Cortlandville	Cortland	187 66
123	Preble-Homer	Preble	Cortland	359 24
377	Cincinnatus	Cincinnatus	Cortland	496 40
446	Cortland-Groton, section 1	Cortlandville	Cortland	7 00
215	Cortland-Dryden, section 1	Cortlandville	Cortland	7 70
147	Burrs Mills	Watertown and Rutland	Jefferson	116 77
181	Watertown-Sacketts Harbor Henderson, section 1	Hounsfield	Jefferson	959 60
183	Adams-Henderson, section 1	Adams	Jefferson	8,462 40
184	Pierrepont Manor-Ellisburg	Ellisburg	Jefferson	841 73
186	Depot	Lyme	Jefferson	258 77
235	Watertown Sacketts Harbor-Henderson, section 2	Hounsfield	Jefferson	185 35
237	Sacketts Harbor	Watertown	Jefferson	117 95
427	Watertown-Carthage, section 2	Rutland and Champion	Jefferson	79 00
185	State, section 1	Lorraine	Jefferson	84 20
3	Deerfield	Deerfield	Oneida	626 82
71	Utica Paris	New Hartford	Oneida	5,001 57
139	Hamilton Bridge	Vernon	Oneida	536 93
140	Seneca Turnpike	Vernon	Oneida	1,219 43
250	Utica Oneida Castle, section 1	New Hartford, Kirkland and Westmoreland	Oneida	1,907 06
295	Mohawk River road, Floyd	Floyd	Oneida	200 54
296	Mohawk River road, Marcy	Marcy	Oneida	205 36
297	Mohawk River road, Deerfield	Marcy and Deerfield	Oneida	131 50
560	Mohawk River road, Rome	Rome	Oneida	119 51
8	Cortland street	Onondaga	Onondaga	540 54
9	James street	Dewitt	Onondaga	509 37
75	Fabius Apulia, section 2	Fabius	Onondaga	955 42
74	Marcellus Marietta	Marcellus	Onondaga	392 85
76	LaFayette	LaFayette	Onondaga	132 73
122	East Lake	Skaneateles	Onondaga	1,648 45
132	Genesee turnpike	Geddes	Onondaga	332 56
290	South Salina street	Onondaga	Onondaga	22 00
429	Thompson	Dewitt	Onondaga	2,587 50
430	Jordan Valley	Elbridge	Onondaga	637 78
280	Oswego-Sterling	Oswego	Oswego	281 87
370	Minetto	Oswego	Oswego	71 03
509	Oswego-Mexico, section 1	Scriba	Oswego	213 13
	Division Office			150 00
	Total			$48,490 09

North Salina Street Bridge, Syracuse.

Chapter 668, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Fred W. Sarr	First resident engineer	$225 per month	$100 00	$1 80	$101 80
D. C. Wedgeworth	Assistant engineer	6 00 per day	822 00	8 87	830 87
Edward M. Ellis	Assistant engineer	6 00 per day	1,075 00	2 00	1,077 00
David R. Lee	Assistant engineer	6 00 per day	162 00	1 62	163 62
J. Otis Burt	Assistant engineer	6 00 per day	6 00	....	6 00
S. M. Witbeck	Assistant engineer	5 00 per day	5 00	....	5 00
C. E. C. Harris	Assistant engineer	5 00 per day	5 00	....	5 00
Jno. Bartholomew	Bridge designer	175 per month	789 56	391 16	1,180 72
R. M. Wheeler	Bridge draftsman	110 per month	440 00	....	440 00
G. F. Menden	Bridge draftsman	110 per month	25 81	....	25 81
Geo. E. Maynard	Bridge draftsman	110 per month	24 84	36 41	61 25
I. H. Smallwood	Rodman	4 00 per day	584 50	....	584 50
H. B. Lincoln	Axeman	2 00 per day	4 00	....	4 00
H. W. Giles	Laborer	2 00 per day	2 00	....	2 00
					$4,487 57
Incidental Expenses.					
Postage				$0 30	
Telephone and telegraph				11 04	
Miscellaneous				10 71	
					22 05
Total					$4,509 62

Durhamville Aqueduct.

Chapter 147, Laws of 1903; Chapter 143, Laws of 1905; Chapter 172, Laws of 1907; Chapter 672, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Henry B. Brewster	Division engineer	$300 per month	....	$13 57	$13 57
Fred W. Sarr	Fist resident engineer	225 per month	$100 00	37 09	137 09
Fred J. Wagner	Resident engineer	200 per month	150 00	19 24	169 24
David R. Lee	Assistant engineer	6 00 per day	510 00	11 35	521 35
Edward J. Berry	Leveler	5 00 per day	70 00	23 70	93 70
Foster B. Crocker	Leveler	4 50 per day	387 00	....	387 00
George H. Thomas	Rodman	4 00 per day	132 00	....	132 00
P. H. Budd	Rodman	3 50 per day	31 50	....	31 50
Don A. Wilcox	Inspector	3 50 per day	236 50	....	236 50
C. H. Mattison	Inspector	3 50 per day	7 00	1 35	8 35
Alfred Evans	Inspector	3 50 per day	63 00	....	63 00
					$1,793 30
Incidental Expenses.					
Livery				$15 00	
Postage				2 33	
Telephone and telegraph				3 91	
Miscellaneous				49 95	
					71 19
Total					$1,864 49

Surveys for State Court of Claims.

Chapter 686, Laws of 1906; Chapter 578, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Guy Moulton	Resident engineer	$225 per month	$7 26	$4 24	$11 50
T. M. Ripley	Resident engineer	200 per month		47 17	47 17
L. D. Brownell	Assistant engineer	6 00 per day	270 00	43 73	313 73
Fred'k S. Strong	Assistant engineer	6 00 per day	66 00	60 07	126 07
Joseph N. Slater	Assistant engineer	6 00 per day	42 00		42 00
Jos. H. Young	Assistant engineer	6 00 per day	96 00	40 10	136 10
D. E. Whitford	Assistant engineer	6 00 per day	427 00		427 00
Arthur G. Crysler	Assistant engineer	5 00 per day	15 00		15 00
Joseph B. Burns	Assistant engineer	5 00 per day	10 00		10 00
Edward J. Berry	Leveler	5 00 per day	75 00	16 86	91 86
A. W. Rogers	Inspector	3 50 per day	21 00		21 00
Geo. J. Goehl	Inspector	3 50 per day	27 00		27 00
Thos. M. Lawrence	Chainman	2 50 per day	2 50		2 50
Dwight C. Howard	Axeman	2 00 per day	12 00		12 00
C. R. McEllen	Axeman	2 00 per day	4 00		4 00
W. R. Curley	Laborer	2 00 per day	10 00		10 00
					$1,296 93
Incidental Expenses.					
Livery				$12 00	
Postage				50	
Telephone and telegraph				3 86	
Miscellaneous				15 88	
					32 24
Total					$1,329 17

SUMMARY.

The foregoing tables are summarized as follows:

Ordinary Repairs to Canals.

1.	Erie canal, chapter 577, Laws of 1907	$9,000 00

Construction of Barge Canal.

2.	Construction of Barge canal, Erie canal, chapter 147, Laws of 1903; chapter 143, Laws of 1905; chapter 172, Laws of 1907	103,467 30
3.	Construction of Barge canal, Oswego canal, chapter 147, Laws of 1903; chapter 143, Laws of 1905; chapter 172, Laws of 1907	43,532 90

Improvement of Public Highways.

4.	Improvement of public highways, chapter 115, Laws of 1898; chapter 468, Laws of 1906	205,265 00
5.	Maintenance and repairs of improved public highways, chapter 115, Laws of 1898; chapter 468, Laws of 1906; chapter 686, Laws of 1906	48,490 00

Special Work.

6.	North Salina street bridge, Syracuse, chapter 668, Laws of 1906	4,509 62
7.	Durhamville aqueduct, chapter 147, Laws of 1903; chapter 143, Laws of 1905; chapter 672, Laws of 1906; chapter 172, Laws of 1907	1,864 49

Special Surveys.

8.	Surveys for State Court of Claims, chapter 686, Laws of 1906; chapter 578, Laws of 1907	1,329 17
	Total	$417,458 48

TABLE OF CONTRACTS COMPLETED ON THE MIDDLE DIVISION DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908.

CONTRACTOR.	Date of contract.	Character of work	Act.		Appropriation	Contract price	Final payment.
			Chap.	Year.			
Henry Tosh & Son ...	Mar 12, 1908	Repairing the Montezuma turnpike bridge over county	575	1907	$2,500 00	$1,786 00	$1,716 25
Theo. F. Kalbfleisch ...	Dec. 3, 1907	ct under the Erie canal ounty	672	1906	76,600 00	56,093 00	52,327 97

TABLE OF CONTRACTS COMPLETED ON THE MIDDLE DIVISION DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908 — (Continued).

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Final payment.
Celestin C. Burns	July 7, 1906	Watertown-Sacketts Harbor-Henderson (section 2) road, No. 235, Jefferson county	$13,962 00	$17,986 46
Celestin C. Burns	July 7, 1906	Henderson Harbor road, No. 238, Jefferson county	27,858 00	33,852 52
Casey & Murray	July 10, 1906	county	133,050 00	146,707 70
County of Broome	July 12, 1906		26,474 70	26,678 30
Hinman & Sproul	July 12, 1906		13,319 00	13,341 55
County of Broome	July 12, 1906		54,662 70	55,109 27
County of Broome	July 12, 1906		14,406 28	14,175 84
Barnett Contracting Co	Sept 18, 1906		12,700 00	16,135 95
Wm. J. Dwyer	Aug. 31, 1906		12,200 00	12,127 22
Stewart Kerbaugh-Shanley Co	Oct 18, 1907		10,934 45	10,111 63
Casey & Murray	July 10, 1906		26,750 00	31,043 81
Casey & Murray	July 10, 1906		43,250 00	52,078 64
Wm. J. Dwyer	Aug 31, 1906		17,300 00	18,846 35
Charles H. Quereau	Nov. 23, 1906		30,250 00	30,972·03
John H. Gordon	Aug 29, 1906		28,000 00	28,453 57
County of Broome	July 12, 1906		6,290 50	6,367 43
Brayer Brothers	July 10, 1906		18,000 00	19,224 08
Allyn G. Bridge	Nov 27, 1906		34,759 75	35,930 48
Frederick Williams	Nov. 16, 1906	county	11,000 00	11,011 31
Wm. J. Semper	July 3, 1906	n county	24,000 00	23,701 70
Wm. J. Dwyer	July 9, 1906		22,700 00	21,929 97
County of Tompkins	Aug 30, 1906		33,238 75	33,216 18
Daniel V. Brown	Nov. 10, 1906	nty	37,769 00	40,969 88
Wm. I. Tyler	July 6, 1906	nty	19,000 00	18,727 49
Mott & Kemper	July 6, 1906	nty	44,700 00	44,853 81
Chambers & Grady	Dec. 4, 1907		16,782 70	15,821 63

TABLE OF CONTRACTS COMPLETED ON THE MIDDLE DIVISION DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908 — (Concluded).

Maintenance and Repairs of Improved Public Highways.

Chapter 468, Laws of 1906; Chapter 686, Laws of 1906.

CONTRACTOR.	Date of contract.	Character of work.	Contract price.	Final payment.
County of Broome	July 26, 1906	Repair contract No. 6—Roads Nos. 125 and 127, Broome county	$4,794 50	$5,272 10
Joseph H. Conners	July 17, 1907	Repair contract No. 22—Roads Nos. 3 and 71, Oneida county	8,162 50	8,167 50
Joseph H. Conners	July 17, 1907	Repair contract No. 23—Road No. 147, Jefferson county	3,637 50	3,701 17
Douglas V. Ashley	July 19, 1907	Repair contract No. 24—Road No. 224, Chenango county	6,932 50	6,905 42
Joseph H. Conners	July 17, 1907	Repair contract No. 25—Roads Nos. 49 and 121, Onondaga county	10,825 00	10,835 85

TABLE OF CONTRACTS PENDING ON THE MIDDLE DIVISION, SEPTEMBER 30, 1908.

CONTRACTOR.	Date of contract.	Character of work.	Act. Chap.	Act. Year.	Appropriation.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1908.
National Construction Co.	Nov. 1, 1906	Constructing stairways for the lift bridge at Catharine street, Syracuse	683	1906	$1,500 00	$1,065 50	$1,500 00	$675 00
John M. Shultz	Jan. 15, 1907	Constructing a lift bridge over the Oswego canal at North Salina street, Syracuse	668	1906	*75,000 00	62,621 00	65,686 00	60,228 00
John Young and Patrick J. Cawley	July 8, 1908	Constructing a protection wall on the west side of Skaneateles lake outlet	675 400 394	1906 1907 1908	15,000 00	9,122 00	11,893 00	....

* $31,250.00 appropriated by city of Syracuse and $12,500.00 by Syracuse Rapid Transit Railway.

Construction of Barge Canal.

Chapter 147, Laws of 1903, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price as affected by alterations.	Payments to September 30, 1908.
Empire Engineering Corporation	April 18, 1905	Contract No. 4, Erie canal — The 4½ miles east of Oneida lake	$812,560 00	$729,567 75	$360,252 00
Empire Engineering Corporation	April 18, 1905	Contract No. 5, Erie canal — Mosquito Point to Fox Ridge	421,252 50	375,871 57	113,238 00
The Groton Bridge Co.	Aug. 10, 1906	*Contract No. 7, Erie canal — Bridges on contracts Nos. 4 and 5	39,883 30	42,989 90	25,353 00
Mosier & Summers	June 7, 1906	Contract No. 10, Oswego canal — Through Fulton	1,149,988 00	1,107,610 32	176,706 00
Stewart-Kerbaugh-Shanley Co.	Sept. 23, 1907	Contract No. 12, Erie canal — Oneida lake to Mosquito Point	3,082,560 00	3,391,833 66	234,036 00
Gilmour-Horton-Allen Co.	Sept. 16, 1907	Contract No. 35, Oswego canal — Through Oswego	752,760 00	745,967 90	43,128 00
Scott Brothers	May 6, 1908	Contract No. 45, Erie canal — Through Baldwinsville; Caughdenoy dam	425,124 00	467,513 50	42,741 00

* Contract No. 7 includes work on Eastern, Middle and Western divisions.

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1908
John Weber & Sons, Inc	Dec 31, 1906	Cortland Homer road, No. 208, Cortland county	$8,600 00	$7,545 00	$6,518 88
Celestin C Burns	July 7, 1906	Adams Henderson (section 2) road, No 234, Jefferson county	49,950 00	45,176 00	50,147 32
Stewart - Kerbaugh - Shanley Co	Sept. 20, 1907	Redwood–Alexandria Bay (section 2) road, No. 236, Jefferson county	38,200 00	35,467 20	16,177 29
Stewart - Kerbaugh - Shanley Co	Sept. 20, 1907	Coleman Hill (section 1) road, No 245, Onondaga county	15,600 00	14,716 45	11,694 46
Casey & Murray	Sept. 15, 1906	Utica–Oneida Castle (section 2) road, No. 271, Oneida county	86,500 00	79,800 00	82,687 05
Chambers & Grady	Dec. 4, 1907	Seneca River road, North Side, No 273, Seneca county	17,850 00	15,886 50	13,316 25
Hinman & Sproul	July 12, 1906	Union Maine road, No. 275, Broome county	31,500 00	30,604 00	26,717 30
Stewart - Kerbaugh - Shanley Co	Sept 20, 1907	Syracuse Watertown road, No 278, Oswego county	26,950 00	23,475 80	17,825 58
Stewart - Kerbaugh Shanley Co	Sept 20, 1907	West Oswego River road, No. 279, Oswego county	27,800 00	25,423 35	21,485 25
C. H Quereau Co., Inc	July 10, 1906	West Lake (section 2) road, No 292, Onondaga county	10,550 00	9,350 00	6,466 10
C H Quereau Co Inc	July 10, 1906	East Lake (section 2) road, No 293, Onondaga county	9,500 00	8,750 00	8,074 53
Henry C Schroeder	Sept. 18, 1907	Reservation road, Fayette, No 320, Seneca county	50,500 00	45,743 15	21,930 24
Stewart Kerbaugh – Shanley Co	Sept. 20, 19[illegible]	[illegible] turnpike (section 1) road, No. 330,	28,500 00	27,093 00	19,864 44
County of Tompkins	Aug. 30, 1[illegible]	[illegible] No. 336, Tompkins county	37,400 00	33,182 00	26,651 70
Stewart Kerbaugh – Shanley Co	Sept 20, 1907	Syracuse turnpike road, No. 337, Madison county	13,800 00	12,525 30	4,953 89
County of Tompkins	Aug. 30, 1906	Catskill turnpike (section 2) road, No. 338, Tompkins county	14,900 00	13,111 00	11,833 78
Wm I Tyler	Sept 18, 1906	Georgetown road No 339 Madison county	31,400 00	27,487 50	23,007 05
Wm J. Dwyer	July 9,		20,400 00	18,000 00	17,834 41
John H Gordon	Nov 23,		36,000 00	34,500 00	30,739 50
Hinman & Sproul	July 12,		33,550 00	32,902 60	29,020 09
John Weber & Sons, Inc	July 10,		30,750 00	26,661 00	22,819 27
John Weber & Sons, Inc	Sept 19,		7,600 00	6,868 00	5,686 70
Mott & Kemper	Nov 14,		42,400 00	37,300 00	32,962 50
Stewart Kerbaugh - Shanley Co	Sept. 20,		27,300 00	26,475 75	....
The Scofield Co	Nov 10,		31,960 00	28,250 00	25,103 26
Hinman & Sproul.	July 12,		35,600 00	35,287 18	12,703 39

TABLE OF CONTRACTS PENDING ON THE MIDDLE DIVISION, SEPTEMBER 30, 1908 — (Continued).

Improvement of Public Highways — (Continued).

CONTRACTOR.	Date of contract	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1908.
Casey & Murray	Dec. 2, 1907	Conklin road, No. 421, Broome county	$84,100 00	$80,191 25	$64,678 86
Stewart Kerbaugh Shanley Co	Sept 20, 1907	Watertown-Theresa (section 3) road, No. 423, Jefferson county	40,350 00	39,419 85	1,693 12
Wm J Semper	Mar. 23, 1908	State (section 2) road, No. 426, Jefferson county	46,950 00	45,330 50	34,145 64
Stewart Kerbaugh Shanley Co	Dec 18, 1907	Watertown-Carthage (section 3) road, No. 428, Jefferson county	34,400 00	32,047 55	21,545 69
J Charles Dayton	July 20, 1906	Skaneateles Spafford road, No 431, Onondaga county	27,700 00	25,997 00	22,695 38
M F Dollard	Aug 29, 1908	Augusta road (Lowell and Spencer sections), No 438, Oneida county	70,500 00	66,666 00	66,268 16
Joseph McCormick	Dec 20, 1907	Lisle Center Lisle road, No. 445, Broome county	35,250 00	31,362 45	25,420 57
Stewart Kerbaugh Shanley Co	Sept 20, 1907	Phoenix Pennellville road, No. 450, Oswego county	21,550 00	18,787 50	. . . . .
Stewart Kerbaugh Shanley Co	Jan 14, 1908	Minetto Fulton roa[illegible]	24,300 00	21,561 50	. . .
Wm J Dwyer	July 9, 1906	Cicero South Bay [illegible] ty	33,100 00	28,937 95	7,130 92
County of Tompkins	Aug 30 1906	Wyckoff road, No [illegible]	4,500 00	3,851 25	1,178 49
County of Tompkins	Aug 30, 1906	Catskill turnpike (section 3) road, No. 483, Tompkins county	44,400 00	35,655 25	17,281 47
John Young	Nov 10, 1906	Skaneateles West Lake (sections 3, 4 and 5) road, No. 486, Onondaga county	37,000 00	31,994 00	28,007 79
Daniel V Brown	Nov 10, 1906	Elbridge road, No 487, Onondaga county	44,300 00	36,487 00	25,829 88
Stewart-Kerbaugh-Shanley Co	Oct 18, 1907	Belle Isle road, No 488 Onondaga county	17,800 00	17,633 90	10,605 02
John Weber & Sons, Inc	July 10, 1906	Homer-Tully (section 1) road, No. 510, Cortland county.	29,366 00	25,770 00	21,337 56
Stewart Kerbaugh-Shanley Co	Sept. 20, 1907	Massena-Waddington (sections 1, 2, 3 and 4) road, No. 521, St. Lawrence county	61,800 00	59,660 00	37,527 86
Stewart Kerbaugh Shanley Co.	Sept 20, 1907	Cortland Dryden (section 2) road, No 535, Cortland county	21,750 00	20,019 60	9,236 47
Casey & Murray	Sept. 19, 1907	Utica Bridgewater road, No. 559, Oneida county	81,000 00	76,347 00	71,601 23
Casey & Murray	Sept 19, 1907	Mohawk River road, Rome, No. 560, Oneida county	24,600 00	23,406 70	19,580 42
Brown & Lowe	Jan. 29, 1908	Rome Northwestern (section 1) road, No. 561, Oneida county	57,400 00	51,272 67	43,578 40

Brown & Lowe	Jan. 29,	, Oneida	41,400 00	37,685 38	1,323 54
Hyde, Hyde & Edy	Mar. 4,		60,350 00	49,660 42	20,300 06
The Scofield Co	Nov. 10,	, Cayuga	76,900 00	69,660 00	67,087 08
Jeremiah T. Finch	Nov. 15,		89,800 00	82,392 00	66,899 81
Chambers & Grady	Sept. 18,		55,400 00	47,000 00	41,986 16
Chambers & Grady	Dec 4,	county.	45,650 00	43,327 45	18,758 97
Stewart Kerbaugh - Shanley Co.	Sept. 20,	No. 596,	35,900 00	32,988 50	23,674 86
Newport Construction Co	Oct. 22,	go county	36,550 00	33,127 15	28,772 12
Stewart Kerbaugh Shanley Co	Dec 14, 1907	Norwich-Preston road, No. 598, Chenango county	59,700 00	52,664 60	31,543 38
Delaware Construction Co	Feb. 4, 1908	Smyrna Otselic road, No. 599, Chenango county	62,400 00	60,169 90	18,691 34
Stewart Kerbaugh - Shanley Co	Sept. 20, 1907	Cayuga Heights-Hanshaw's Corners road, No. 606, Tompkins county	25,000 00	21,511 75	15,992 77
Stewart - Kerbaugh - Shanley Co	Sept. 20, 1907	Auburn-Owasco road, No. 614, Cayuga county	59,000 00	54,662 15	27,475 79
Stewart Kerbaugh Shanley Co	Sept. 20, 1907	Trumansburg Ithaca road, No. 616, Tompkins county	94,500 00	88,439 60	65,093 62
Stewart Kerbaugh Shanley Co	Dec. 18, 1907	Granby road, No. 653, Oswego county	63,200 00	57,586 00	33,077 02
Stewart Kerbaugh - Shanley Co	Dec. 18, 1907	Cato-Meridian-Baldwinsville road, No. 684, Cayuga county	59,400 00	55,752 65	34,312 01
Stewart Kerbaugh - Shanley Co.	Feb 11, 1908	(section 2) road, No. 726, Madison	89,250 00	77,721 10	47,257 02
Ryan & Yale	April 23, 1908	(section 1) road, No 732, St. Lawrence	75,550 00	64,472 50	25,875 50
Ryan & Yale	April 23, 1908	(section 2) road, No. 733, St. Lawrence county	80,100 00	67,115 65	28,016 31

WATER RECORDS OF CAYUGA AND CROSS LAKES AND SENECA RIVER.

(See State Engineer's Reports for 1905, 1906 and 1907 for previous records.)

LOCATION.	1907. December 10.		1908. March 10.		1908. August 6.		Remarks.
	Surface.	Depth.	Surface.	Depth.	Surface.	Depth.	
Cayuga lake	— 9.308	9.8	— 7.808	11.3	— 7.958	11.1	Depth on lower miter-sill.
Mud lock	— 9.584	9.5	— 8.064	11.0	— 8.284	10.8	Depth on lower miter-sill.
Canandaigua river, south of canal	—11.980	4.6	— 9.450	6.5	—12.780	3.3	Depth of river.
Seneca river aqueduct	—12.151	5.3	— 9.601	7.6	—13.051	4.2	Depth on aqueduct foundation.
Canandaigua river, north of canal	—12.246	4.2	— 9.716	6.5	—13.170	3.5	Depth of river.
West Shore railroad crossing	—12.499	3.0	— 9.949	5.3	—13.289	2.7	Depth in channel.
N. Y. C. & H. R. R. R. crossing	—12.756	3.1	—10.066	5.6	—13.466	2.5	Depth on bridge foundation.
Mosquito Point	—14.766	6.0	—11.676	8.2	—15.166	5.3	Depth in channel.
Cross lake	—15.727	16.5	—13.027	18.7	—16.027	18.0	Depth at iron bridge.

REPORT

OF THE

DIVISION ENGINEER

OF THE

WESTERN DIVISION

For the Fiscal Year Ended September 30, 1908

WESTERN DIVISION.

STATE OF NEW YORK.
DEPARTMENT OF STATE ENGINEER AND SURVEYOR,
WESTERN DIVISION.

ROCHESTER, N. Y., *October* 1, 1908.

Hon. FREDERICK SKENE, *State Engineer and Surveyor, Albany, N. Y.:*

SIR.— I have the honor of submitting to you the annual report for the Western Division, for the year ended September 30, 1908.

Assistance has been furnished the Department of Public Works in the line of surveys for blue line and surveys for abandonment of property, as well as surveys made and data collected for use of the Attorney-General in the defense of suits before the Court of Claims.

Investigations and reports have been made on legislative bills which have been referred to this division.

BARGE CANAL.

(Chapter 147, Laws of 1903.)

Work was continued at the various residencies and under the respective engineers as follows:

Lyons Residency, No. 8.— From the west line of the town of Savannah to the west line of Wayne county, with office at Lyons, N. Y., under B. E. Failing, Resident Engineer.

Rochester Residency, No. 9.— From the west line of Wayne county to the west line of Monroe county, with office at Rochester, N. Y., under the direction of T. J. Morrison, Resident Engineer.

Medina Residency, No. 10-*A*.— From the west line of Monroe county to 100 feet east of Gasport bridge No. 151, with office at Medina, under George T. Keith, Resident Engineer, from September 30, 1907, to November 1, 1907, when Charles A. Ingersoll was appointed Resident Engineer and placed in charge of this residency, since which time he has had charge of same.

Lockport Residency, No. 10-B.— From 100 feet east of Gasport bridge No. 151, to the head of Sulphur Springs guard-lock, with office at North Tonawanda, N. Y., under T. W. Barrally, Resident Engineer.

Tonawanda Residency, No. 11.— From the head of Sulphur Springs guard-lock to Buffalo harbor, with office at North Tonawanda, N. Y., under T. W. Barrally, Resident Engineer.

ERIE CANAL, RESIDENCY NO. 8.

Mr. B. E. Failing reports the following work done on this residency:

Office.— Plotting topography on 50-ft., 100-ft. and 1,000-ft. scale maps of Residency No. 8. Plans, tracings and estimates were made for Contracts 47 and 48 and 50 per cent completed for Contract 49.

Field.— The field work has consisted in making topographical surveys of Ganargua creek from Lyons to Newark and north of the New York Central railroad from Newark to Palmyra. Detail surveys of structures, center lines run and cross-sections taken.

Field work has been completed on Contracts Nos. 47 and 48 and about 90 per cent finished on Contract No. 49.

Borings.— Borings have been finished on Contracts Nos. 47 and 48 and about 72 per cent completed on Contract No. 49.

ERIE CANAL, RESIDENCY NO. 9.

Residency No. 9 extends from the east line of Monroe county to the west line of the county, a distance of 39.46 miles. This residency has been subdivided into the following contract sections:

Contract No. 63, from Wayne county line to King's Bend, a distance of 12.19 miles.

Contract No. 41, embracing the Irondequoit creek cut-off between Bushnell's Basin and Cartersville, a distance of 0.80 mile.

Contract No. 23, from King's Bend to the Genesee river, a distance of 5.63 miles.

Contract No. 21, from the Genesee river to the New York Central railroad crossing near Lincoln Park, a distance of 2.45 miles. This contract also embraces the construction of a harbor in the Genesee river at Rochester.

Contract No. 6, from the New York Central railroad crossing to about one mile east of South Greece, a distance of 3.28 miles.

Contract No. 60, from the west end of Contract No. 6 to about one-half mile west of Adams Basin bridge, a distance of 8.53 miles.

Contract No. 61, from about one-half mile west of Adams Basin bridge to the west line of Monroe county, a distance of 7.39 miles.

Contract No. 63.— Preliminary surveys under Geo. C. Mills, Assistant Engineer, were begun December 9, 1907, and are now about 80 per cent finished.

Cross-sections and soundings have been completed and topography, borings and surveys of structures finished from Fairport to King's Bend. The old blue lines of the canal have been resurveyed from Bushnell's Basin to King's Bend and the base line has been monumented for the same distance.

Cross-sections and soundings have been plotted and about 75 per cent of the maps prepared for contract drawings. Lay-out plans for structures are well under way and the preliminary estimate of prism excavation and embankments has been made.

Contract No. 41.— This contract embraces the construction of the high embankments of the Irondequoit creek cut-off. It covers a portion of the section embraced by Contract No. 63 and provides for the construction of the embankments only. The work necessary to finish the prism will be done under Contract No. 63, after the embankments have settled.

The preliminary surveys, borings, etc., for this contract have been made and the contract drawings and estimate of quantities have been prepared and sent to Albany.

Contract No. 23.— Since the completion of the surveys noted in the last annual report, the proposed center line of canal has been changed. This necessitated additional surveys and borings. These have been made and the information plotted and sent to Albany.

Contract No. 21.— Additional surveys and borings due to change of line have been made and the contract drawings of the canal portion of the contract revised and sent to Albany. Preparations are now being made to survey some lands required for spoil-banks.

Contract No. 6.— This contract has been under construction since June, 1905. Under the original contract the date set for completion was May 3, 1908. On account of several alterations, however, which increased the amount of work to be done, an extension of time to November 15, 1909, was granted. F. A. Maselli is the contractor. During the fiscal year the work was under the direction of R. J. Marcher, Resident Engineer, up to December 9, 1907, when the writer took charge. H. J. Hemstreet, Assistant Engineer, has had local charge.

The work called for by this contract consists mainly of excavation in new canal cut, most of which is rock. Four separate plants have been engaged in this work as follows:

Steam-shovel and Incline No. 1 worked from Station 2594 to Station 2608, removing the top lift of earth. On December 3, 1907, the use of this unit was abandoned and the shovel laid up at the Buffalo road to be overhauled and repaired.

On May 26, 1908, Steam-shovel No. 1, having been thoroughly repaired, started to work at the Buffalo road in conjunction with two locomotives, each hauling ten four-yard cars. This plant worked between Station 2571 and Station 2586, the excavated material being hauled out of the cut and deposited on spoil-banks between the Lyell and Buffalo roads. The length of the haul varied between 800 and 2,500 feet.

Steam-shovel and Incline No. 2 has worked between Station 2584 and Station 2650, removing earth and rock. Two steam-drills have been operated in connection with it. This plant started work on October 18, 1907, and stopped September 17, 1908. It has been much interfered with by water, no work having been done between December 15, 1907, and April 14, 1908. During this time the cut between the Falls road bridge and the Buffalo road was practically full of water, the steam-shovel being almost entirely submerged. The contractor kept several powerful pumps working almost continuously during the winter and spring, but was unable to drain the cut. A passage has now been cut through to the west end of the contract, which affords a means of drainage, so that no trouble of this kind is anticipated for the coming winter.

The bridge conveyor has worked between Station 2648 and Station 2687, removing the rock down to grade for the entire width

of the prism, with the exception of a narrow ledge on each side, which it is intended to break down in the spring and remove with the steam-shovel and train outfit. This unit lost over two months on account of fire and the breaking down of the bucket. Aside from this delay, progress has been good and the plant is proving itself an efficient machine. The work has been almost entirely in rock. Two steam-drills have been used in conjunction with the conveyor.

In September, 1908, two channeling machines were set up at Station 2655. The bits used were found unsuitable for the rock encountered, so the use of the machines was abandoned until the proper bits could be procured.

The following table gives the quantity of material excavated by each unit for each month of its operation:

MONTH.	BRIDGE CONVEYOR.		STEAM-SHOVEL AND INCLINE No. 1.		STEAM-SHOVEL AND INCLINE No. 2.		STEAM-SHOVEL No. 1 AND TRAIN OUTFIT.	
	CUBIC YARDS.		CUBIC YARDS.		CUBIC YARDS.		CUBIC YARDS.	
	Earth.	Rock.	Earth	Rock.	Earth.	Rock.	Earth.	Rock.
October, 1907	00	29,748	3,793	5,624	9,559	00	....	....
November, 1907	00	25,020	3,841	4,939	28,251	00	....	....
December, 1907	1,644	27,655	2,354	00	5,840	00	....	....
January, 1908	00	11,597	00	00	00	00	....	....
February, 1908	00	10,550	00	00	00	00	....	....
March, 1908	00	27,882	00	00	00	00	....	....
April, 1908	4,062	7,209	00	00	1,157	6,368	....	....
May, 1908	812	31,699	00	00	3,335	11,150	4,077	00
June, 1908	4,465	31,905	00	00	9,573	4,461	23,228	5,513
July, 1908	3,194	31,648	00	00	5,330	7,457	00	15,454
August, 1908	4,165	28,187	00	00	3,313	10,242	00	9,341
September, 1908	474	23,608	00	00	2,746	2,798	00	16,428

Bridge conveyor worked two eight-hour shifts per day.
Steam-shovel and Incline No. 1 worked one eight-hour shift per day.
Steam-shovel and Incline No. 2 worked one eight-hour shift per day, except from May 18 to June 30, when two eight-hour shifts were worked.
Steam-shovel No. 1 and train outfit worked one eight-hour shift per day, except from June 8 to August 14, when two eight-hour shifts were worked.

The crossings of the Buffalo, Lyell and Lee roads have been cut through and temporary crossings provided. The following progress has been made on the substructures of the bridges at these roads:

Buffalo Road Bridge.— The east abutment was built in August, 1908, and the west abutment in September. This bridge is now ready for the erection of the superstructure.

Lyell Road Bridge.— The earth excavation for the east abutment was made in August, 1908, and the earth and rock excava-

tion for the west abutment practically completed in September. The plans for these abutments were changed under Alteration No. 6. The original plans called for the construction of the abutments on top of the rock several feet above grade. It was found that the rock was softer than was anticipated and the plans were therefore changed so as to provide for carrying the abutments down to grade.

Lee Road Bridge.— Excavation for the abutments for this bridge was begun in August, 1908. They are now nearly completed.

The New York Central railroad (Falls branch) bridge crossing the canal at Station 2653+68 has been raised 1½ feet to afford the necessary clearance. The bridge-seats, backwalls and wings have been built up and the tracks ballasted.

The Buffalo, Lockport and Rochester Electric railway has built a temporary bridge across the cut at the Lee road and is now operating cars over it. The company is making preparations to build its permanent bridge this fall.

The following is a table showing the percentage of work done during the year and to date on Contract No. 6:

ITEM OF WORK.	Total quantities as modified by alterations 1 to 6.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Clearing . . . acres.	27	0.0	21.6	0	80
Grubbing . . . cu. yds.	4,500	0.0	3,711.0	0	82
All excavations . . . cu. yds.	2,093,760	538,815.0	1,406,907.0	26	67
Channeling . . . sq. ft.	228,840	454.0	454.0	0.2	0.2
Forming embankment . . . cu. yds.	33,340	6,303.0	28,899.0	19	87
Puddle . . . cu. yds.	1,700	0.0	0.0	0	0
White oak timber and plank . . . ft. B. M.	500	0.0	0.0	0	0
Hemlock timber and plank . . . ft. B. M.	500	0.0	0.0	0	0
Second-class concrete . . . cu. yds.	1,754	231.8	466.0	13	27
Third-class concrete . . . cu. yds.	300	0.0	264.6	0	88
First-class masonry coping . . . cu. yds.	15	0.0	1.93	0	13
Wash-wall, including coping . . . cu. yds.	9,000	0.0	0.0	0	0
Stone paving . . . sq. yds.	60	0.0	0.0	0	0
Fencing . . . lin. ft.	1,400	0.0	0.0	0	0
Macadam pavement . . . sq. yds.	500	0.0	0.0	0	0

Total of all work done during the year = 24.7 per cent of estimated cost.
Total of all work done to date = 64.2 per cent of estimated cost.

The following is a table showing the percentage of work done during the year and to date on Contract No. 7 (bridges on Contract No. 6):

ITEM OF WORK.	Total quantities as by original contract.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Structural steel in place .... lbs.	530,000	0.0	118,(02	0	22
Yellow pine or Douglas fir lumber ... ft. B. M.	47,000	0.0	10,139	0	22
Setting stone copings .... cu. yds.	11.9	0.0	2	0	17
Lining .... cu. yds.	12	0.0	3	0	25

Total of all work done during the year = 0 per cent of estimated cost.
Total of all work done to date = 6 per cent of estimated cost.

Contract No. 60.— Plans for this contract were prepared and on August 6, 1908, the work let to the Empire Engineering Corporation. Lewis G. Fisher, Assistant Engineer, is in local charge with headquarters at Spencerport.

Appropriation surveys and maps have been made for a large portion of the right of way.

The work consists chiefly in enlarging the present Erie canal, with two land cuts, one connecting with Contract No. 6 and the other at South Greece. The necessary bridges, culverts, waste-weirs, etc., are included.

Eighty-five per cent of the clearing has been done from Station 3190 to Station 3466+84.

Steam-shovel No. 1 and train outfit started to work on the South Greece cut September 25, 1908, and has worked from Station 3090 to Station 3095.

Steam-shovel No. 2 and train outfit has been delivered at Adams Basin ready to excavate in borrow-pit at west end of contract.

The south embankment has been partially grubbed from Spencerport village to the west end of the contract.

Piles have been driven for the south abutment of Bridge No. 102 and the abutments partially built.

Large quantities of machinery, tools, supplies, etc., have been delivered and the contractors give every indication of an intention to carry on the work vigorously.

The following is a table showing the percentage of work done during the year and to date on Contract No. 60:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
Coffer-dams, pumping, bailing and draining. miles	8.5	0.0	0.0	0	0
Clearing .... lump sum	1	0.52	0.52	52	52
Grubbing .... cu. yds.	47,800	1,864.0	1,864.0	4	4
Excavation .... cu. yds.	1,197,000	6,431.0	6,431.0	0.5	0.5
Sheeting and bracing .... ft. B. M.	10	0.539	0.539	5	5
Channeling .... sq. ft.	26,000	0.0	0.0	0	0
Embankment, first-class .... cu. yds.	733,700	2,082.0	2,082.0	0.3	0.3
Embankment, second-class .... cu. yds.	163,200	0.0	0.0	0	0
Lining .... cu. yds	24,700	0.0	0.0	0	0
Puddle .... cu. yds.	63,600	0.0	0.0	0	0
Sawed lumber (yellow pine or Douglass fir). M. ft. B. M.	20	0.0	0.0	0	0
Foundation piles .... lin. ft.	13,600	899.0	899.0	6.5	6.5
Wooden sheet-piling .... M. ft. B. M.	30	0.0	0.0	0	0
Second-class concrete .... cu. yds.	7,100	54.0	54.0	0.8	0.8
Third-class concrete .... cu. yds.	1,800	0.0	0.0	0	0
Reinforced concrete .... cu. yds.	1,580	0.0	0.0	0	0
First-class masonry coping .... cu. yds.	15	0.0	0.0	0	0
Wash-wall .... cu. yds.	67,800	0.0	0.0	0	0
Second-class stone paving .... sq. yds.	2,100	0.0	0.0	0	0
Third-class stone paving .... sq. yds.	2,400	0.0	0.0	0	0
Third-class riprap .... cu. yds.	550	0.0	0.0	0	0
Fourth-class riprap .... cu. yds.	100	0.0	0.0	0	0
Cast iron culvert, pipe and specials .... lbs.	94,600	0.0	0.0	0	0
12-in. vitrified pipe, laid .... lin. ft.	20	0.0	0.0	0	0
Trenching and back-filling for 12-in. pipe. lin. ft.	20	0.0	0.0	0	0
Structural steel .... lbs.	800,000	0.0	0.0	0	0
Metal reinforcement .... lbs.	100,400	0.0	0.0	0	0
Wooden pavement, 3 in. thick .... sq. yds.	1,330	0.0	0.0	0	0
Wooden pavement, 4 in. thick .... sq. yds.	650	0.0	0.0	0	0
Wooden fence .... lin. ft.	14,500	0.0	0.0	0	0
Wrought iron pipe railing .... lin. ft.	65	0.0	0.0	0	0
Lattice railing .... lin. ft.	410	0.0	0.0	0	0
Sluice-gate valves, 36 in. x 40 in. .... No.	7	0.0	0.0	0	0
Sluice-gate valves, 33 in. x 33 in .... No.	2	0.0	0.0	0	0
Repointing old masonry .... lin. ft.	1,000	0.0	0.0	0	0
Maintaining navigation .... lump sum	1	0.0	0.0	0	0
Maintaining highway traffic .... lump sum	1	0.0	0.0	0	0

Total of all work done during the year = 0.5 per cent.
Total of all work done to date = 0.5 per cent.

Contract No. 61.— Contract plans and estimates for the prism work and some of the structures on this contract were completed and sent to Albany in June, 1908.

Preparations are now being made to start out a party on appropriation surveys for new right of way.

In addition to the above contracts, this residency takes in Contract No. 38 and a portion of Contract No. 7.

Contract No. 38 calls for the construction of Wapping's bridge on the section covered by Contract No. 63. This bridge was destroyed by a break in the canal that occurred during the summer. A survey of the site has been made and a layout map sent to Albany.

Contract No. 7 covers the construction of the superstructures of the bridges on Contract No. 6. During the fiscal year the

structural steel for the Buffalo road, Lyell road and Lee road bridges was delivered on the ground.

Daily readings have been taken of the gages on the Genesee river, one on the Elmwood avenue bridge, Rochester, and the other on Ballantine's bridge.

ERIE CANAL, RESIDENCY NO. 10–A.

A report of work done on this residency is as follows:

Preliminary Field Work.

(1) Cross-sections of canal around "Loop" in Medina, finished.

(2) Surveys of appropriated land, Contract No. 9, finished.

(3) Made inspection and report on culverts for entire residency.

(4) Located topography and cross-sectioned canal "Loop" at Holley.

(5) Surveys of appropriated land, Contract No. 64, 60 per cent finished.

(6) Measurements of appropriated buildings, Contract No. 64, finished.

(7) Measurements of appropriated buildings, Contract No. 62, finished.

(8) Miscellaneous surveys incidental to preparation of contract plans for the residency.

Borings.

Calyx-drill borings in Oak Orchard gorge, at site of proposed aqueduct, completed.

Preliminary Office Work.

(1) Layout plans at bridges and culverts, Contract No. 62, completed.

(2) Prepared list of appropriated land, Contract No. 9.

(3) Completed preliminary work on contract plans, Contract No. 64.

(4) Prepared list of appropriated lands and buildings, Contract No. 64.

(5) Finished preliminary survey maps, Contract No. 62.

(6) Plotted map and computed estimate, improvement of Holley Loop.
(7) Computed and plotted appropriation maps, Contract No. 9.
(8) Computed and plotted appropriation maps, Contract No. 64, 30 per cent.
(9) Miscellaneous office work, pertaining to the preparation of the contract plans for the residency.

Construction,— Contract No. 9.

Contract let to the Thomas Crimmins Contracting Company, March 18, 1908, for the improvement of the present Erie canal from 0.164 mile east of Eagle Harbor bridge to 0.09 mile west of Beal's bridge; length 5.682 miles. Contractors' office established at Knowlesville, N. Y. Arthur S. Whitbeck, Assistant Engineer, in charge of contract.

Amount of contract....................	$755,995
Work done to October 1, 1908............	62,590

Construction,— Contract No. 64.

Contract let to the Empire Engineering Corporation, August 6, 1908, for the improvement of the present Erie canal, from 600 feet west of Prospect street bridge, Medina, to 100 feet east of Gasport bridge; length 9.91 miles. Contractors' office established at Middleport, N. Y. R. H. Merrill, Assistant Engineer, in charge of contract.

Amount of contract.................... $1,290,492
No estimate for work up to October 1, 1908.

ERIE CANAL, RESIDENCY No. 10-B.

Residency No. 10-B has been divided into three contracts, as follows:

Contract No. 66, from Gasport bridge, Station 5529+18, to the foot of the locks at Lockport, Station 5865. A field party was organized for surveying lands to be appropriated and these were completed for the entire contract during the year. About 15 per cent of the appropriation maps were made and sent to Albany.

Contract No. 67 extends from Station 5864 to Station 5896, in

the city of Lockport. Additional borings with a Calyx drill were made at the lower lock site. This work was completed in May and the boring party disbanded.

Contract No. 40 extends from Station 5896 to the head of the guard-lock at Sulphur Springs. Plans and estimates have been completed and sent to Albany. A list of property and buildings and valuation of same have been completed. Plans have been in progress and are 90 per cent completed, for moving the highway on the berme side about 300 feet southerly from the present location.

ERIE CANAL, RESIDENCY No. 11.

Two contracts are embraced in this residency. Contract No. 19 extends from the guard-lock to the Delaware street bridge, Tonawanda, N. Y., a distance of 12.46 miles.

The contract from the Delaware street bridge to the Niagara river has not been placed under contract.

Contract No. 19 was awarded to the Great Lakes Construction Company of Buffalo, N. Y., November 26, 1906, and was started May 22, 1907. From October 1, 1907, the date of the last annual report, no change was made in the character or method of operation of the plant employed.

Beginning with the working season of 1908, a new Page bucket derrick was installed, making a total of 5 machines in operation for the season of 1908. The machines employed and the method of operation during the season of 1908 are as follows:

(1) A Lidgerwood cableway, operating a three-yard clam-shell, is installed at the east end of the contract for the excavation of material between Station 6180 and the guard-lock, a distance of 3,200 feet. This machine has excavated 103,166 cu. yds. since August, 1907, in about ten full working months, or about 10,000 cu. yds. per month. It will require two more years, at this rate, to complete this portion of the canal.

(2) A Williams revolving derrick, operating a Page bucket, has been excavating on a "cut off" line between Stations 6460 and 6505, about 6 miles east of Tonawanda. Since April 20, 1908, this machine has excavated 141,211 cu. yds., an average of 28,000 cu. yds. per month. This machine is the most efficient one in operation on this contract.

(3) At the west end of the contract near Tonawanda a dipper-dredge is employed for excavating from the prism, the material being deposited in scows, which are towed to points near the shore at the spoil-banks and dumped; it is then dredged again by two clam-shell dredges having booms of 80 and 100 feet, respectively. This method of operation has not been successful and has not been a paying proposition.

The following is a summary showing the amount and percentage of work done during the past year and of work done to date:

ITEM OF WORK.	Preliminary estimate.	Work done during year.	Total work done to date.	Per cent of work done during year.	Per cent of work done to date.
All excavation from guard-lock to Station 6180. . . . . . cu. yds.	240,000	86,423	103,166	36.0	43.0
All excavation from station 6180. . . . cu. yds.	2,842,000	319,563	377,476	11.2	13 3
Foundation piles . . . . . . No.	830	44	44	5.3	5.3
Sheeting and bracing . . . . . ft. B. M.	20,000	8,370	8,370	42.0	42.0
Alteration No. 1 . . . . . . cu. yds.	375,000	10,961	10,961	3.0	3 0
Extra or unspecified fence . . . . . lin. ft.	1,500	1,500	1,500	100.0	100.0

Total of all work done during year = 12.3 per cent.
Total of all work done to date = 14.6 per cent.
NOTE. — These percentages are based on altered contract.

It is apparent from the table that work has been confined almost exclusively to excavation. Work has been started on the Pendleton bridge and material delivered at Tonawanda to begin the construction of a coffer-dam for enclosing the site of the new concrete dock at this point.

DIVISION OFFICE.

The work in the Division office from September 30, 1907, to November 26, 1907, consisted of making a part of the contract plans for Contract No. 60, on Residency No. 9. At that time the work was subdivided and the work on the plans for Contract No. 62 was taken over by the Residency office.

The Division office work was then placed in charge of F. J. Wilbur, Assistant Engineer, who took up the preparation of the contract plans for Contract No. 66, extending from Gasport to the foot of the locks at Lockport. This work consisted of making the plans and estimates for three highway bridges and two culverts. This work was completed and all plans sent to Albany the latter part of February, 1908.

This work was followed by the preparation of contract plans for Contract No. 62, extending from the Monroe-Orleans county line to Contract No. 9, near Eagle Harbor, being 14.15 miles in length. This work consisted of tracing the plan and profile maps, the making of contract plans for ten bridges and eighteen culverts, 1,000-ft. maps, mass diagram and the preliminary estimates for prism and structures. This work was completed and the final plans sent to Albany about the middle of September, 1908.

The remainder of the time in September, 1908, has been occupied in plotting some of the layout plans of bridges on Contract No. 63, and preparation of appropriation maps on Contract No. 60.

IMPROVEMENT OF PUBLIC HIGHWAYS.

(Chapter 115, Laws of 1898, and amendatory laws.)

Road work was carried on during the past year at the following residency offices and under the following engineers:

Albion Residency. D. D. Waldo, Resident Engineer, in charge.

Buffalo Residency. F. M. Williams, Resident Engineer, in charge until July 1, 1908, when he voluntarily resigned, since which time the work has been carried on under John S. Clancy, Assistant Engineer.

Canandaigua Residency. James E. Kelley, Resident Engineer, in charge until August 25, 1908, when John Philo Kelley, Assistant Engineer, assumed charge of the residency.

Olean Residency. George T. Keith, Resident Engineer, in charge.

Rochester Residency. M. W. Wilbur, First Resident Engineer, in charge, until September 1, 1908, when he voluntarily resigned, since which time Charles M. Edwards, First Assistant Engineer, has been in charge of the residency.

Survey parties worked last winter on petitions in the different counties of the Division and plans have been revised and prepared for presentation to the various Boards of Supervisors of the several counties.

CONTRACTS COMPLETED DURING YEAR ENDED SEPTEMBER 30, 1908.

LYELL ROAD, No. 253, MONROE COUNTY.

Length, 2.12 miles.

Width of macadam, 16 and 20 feet.

Engineer's preliminary estimate of total cost, including engineering, $22,000.

Contract dated, July 11, 1906.

Work commenced, April 24, 1907.

Work completed, November 9, 1907.

Final account, $20,285.75.

Contractor, Frederick A. Brotsch.

Engineer in charge, George G. Miller.

This improvement extends from the western boundary of the city of Rochester westerly to the Spencerport road, in the town of Gates.

On December 12, 1906, a permit was granted to the Buffalo, Lockport and Rochester Railway Company, to lay a double-track for electric railway purposes, in this above-named road.

LITTLE RIDGE (SECTION 3) ROAD, No. 256, MONROE COUNTY.

Length, 3.60 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $28,800.

Contract dated, July 13, 1906.

Work commenced, June 22, 1907.

Work completed, November 23, 1907.

Final account, $25,880.78.

Contractor, Greece Construction Company.

Engineer in charge, Frank W. Bristow.

This improvement extends from the Spencerport–Hilton road westerly to the west line of the town of Parma and was originally planned to be built as a three-course road; however, under date of May 8, 1907, a supplemental agreement was entered into whereby this road was to be built in two courses, the bottom course to be four inches thick, of local stone, and the top course three inches thick of local granite, when rolled.

AURORA–BUFFALO (SECTION 2) ROAD, NO. 263, ERIE COUNTY.

Length, 4.23 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $42,400.

Contract dated, July 18, 1906.

Work commenced, April 14, 1907.

Work completed, July 25, 1908.

Final account, $39,486.95.

Contractor, Gantz–Wilson Construction Company.

Engineers in charge, John S. Clancy and E. M. Secrist.

This improvement extends from the eastern line of the town of West Seneca to the northern line of the town of Aurora, in the town of Elma.

AURORA–BUFFALO (SECTION 3) ROAD, NO. 264, ERIE COUNTY.

Length, 0.74 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $6,900.

Contract dated, July 10, 1906.

Work commenced, May 22, 1907.

Work completed, November 16, 1907.

Final account, $6,532.51.

Contractor, County of Erie.

Engineer in charge, John S. Clancy.

This improvement extends from the southern line of the town of Elma to the village of East Aurora, in the town of Aurora.

The construction of roads Nos. 263 and 264 completes an improved highway from Buffalo to East Aurora.

HILTON ROAD, NO. 269, MONROE COUNTY.

Length, 4.30 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $28,000.

Contract dated, July 11, 1906.

Work commenced, April 13, 1907.

Work completed, October 19, 1907.

Final account, $26,970.78.

Contractor, Frederick A. Brotsch.

Engineer in charge, F. W. Bristow.

This improvement extends from the Little Ridge road northerly to the village of Hilton, in the town of Parma. The road, as originally planned, contemplated a three-course road, but under date of September 10, 1907, a supplementary agreement was entered into whereby this road was to be constructed with a four-inch bottom of local stone and a three-inch top of granite, without additional cost to the State.

The Board of Supervisors of Monroe county, after consideration and investigation, passed a resolution providing for increasing the thickness of the above road two inches from Station 73 to Station 114, which stretch of road was soft and springy, across a flat, sandy bottom; also to put in cobble Telford and blind drains between Stations 225 and 227+02, 174+75 and 177+25 and several soft spots, on account of clay bottom. Supplemental agreement was entered into September 10, 1907, covering these changes.

Erin–Horseheads Road, No. 356, Chemung County.

Length, 9.22 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $102,000.

Contract dated, July 7, 1906.

Work commenced, July 30, 1906.

Work completed, November 23, 1907.

Final account, $93,807.99.

Contractors, Bovier and Rawlins.

Engineer in charge, John Philo Kelley.

This road extends from the east line of the village of Horseheads easterly to Mills street, near the village of Erin, in the towns of Erin and Horseheads.

On September 7, 1907, and November 25, 1907, supplemental agreements were entered into covering extra work not called for by the contract; also covering deductions for work called for in the contract and not performed.

FIVE CORNERS–KUCKVILLE (SECTION 1) ROAD, NO. 386, ORLEANS COUNTY.

Length, 3.47 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $21,300.

Contract dated, August 31, 1906.

Work commenced, November 5, 1906.

Work completed, October 12, 1907.

Final account, $20,159.91.

Contractor, Thomas Hucknall.

Engineer in charge, I. O. Cole.

This improvement extends from the Oak Orchard road at Five Corners northwesterly to the north line of the town of Gaines, in the town of Gaines.

Supplemental agreement was entered into between the State and the contractor on December 23, 1907, covering changes made in the road, to better its condition.

KENDALL CORNERS ROAD, NO. 388, ORLEANS COUNTY.

Length, 3.43 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $24,900.

Contract dated, July 9, 1906.

Work commenced, August 5, 1907.

Work completed, June 13, 1908.

Final account, $23,328.73.

Contractors, Chambers and Grady.

Engineers in charge, I. O. Cole and L. R. Barnes.

This improvement extends from the line between the towns of Murray and Kendall northerly to the R. W. & O. R. R. crossing, in the town of Kendall.

This road was originally planned as a three-course road, but under date of May 8, 1907, a supplemental agreement was entered into whereby the road was to be built with a 4-inch local stone bottom and a 3-inch granite top.

PORTLAND AVENUE (SECTION 2) ROAD, NO. 400, MONROE COUNTY.

Length, 0.93 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $7,800.

Contract dated, September 24, 1907.

Work commenced, April 11, 1908.

Work completed, June 13, 1908.

Final account, $7,849.10.

Contractor, Henry C. Schroeder.

Engineer in charge, George G. Miller.

This road extends from the Ridge road northerly to Titus avenue, in the town of Irondequoit.

During construction, a culvert at Station 80+60, which the plans contemplated leaving, was found to be in an unsafe condition; a new 3x3x38-foot culvert was built to replace the old one. Supplementary agreement covering this change was entered into October 14, 1907. On April 11, 1908, an agreement was entered into to tile the ditches instead of making them open, the town to furnish the tile, the balance of the work to be a charge against the road. This was done in accordance with a resolution of the Board of Supervisors, passed April 2, 1908.

RAPIDS–ROCHESTER ROAD, NO. 401, MONROE COUNTY.

Length, 1.9 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $27,170.88.

Contract dated, December 3, 1907.

Work commenced, June 1, 1908.

Work completed, September 1, 1908.

Final account, $28,521.19.

Contractors, Whitmore, Rauber and Vicinus.

Engineers in charge, George G. Miller and Job R. Rogers.

This road extends from the west line of the city of Rochester to its intersection with the Chili road, in the town of Gates.

On May 16, 1908, a supplemental agreement was entered into substituting brick pavement 16 feet wide from Station 7+30 to

Station 64+17, in place of Telford foundation 8 inches thick and 6-inch macadam surface, and to substitute an 8-inch macadam road 14 feet wide, with 5-inch bottom and 3-inch top, from Station 64+17 to Station 107+50, in place of 8-inch Telford with 6-inch macadam surface 16 feet wide, in compliance with a resolution of the Board of Supervisors of Monroe county asking for such change.

RICH'S DUGWAY–PENFIELD ROAD, NO. 408, MONROE COUNTY.

Length, 2.43 miles.

Width of macadam, 14, 15 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $26,000.

Contract dated, November 26, 1907.

Work commenced, May 1, 1908.

Work completed, September 1, 1908.

Final account, $24,666.50.

Contractor, A. J. Rockwood.

Engineer in charge, E. P. Strowger.

This road extends from the Old Oak Tavern westerly to the eastern line of the city of Rochester, in the towns of Penfield and Brighton. The contract for this road was originally let to Patrick A. Lillis, but was assigned to A. J. Rockwood on February 13, 1908.

SUSPENSION BRIDGE–LEWISTON ROAD, NO. 475, NIAGARA COUNTY.

Length, 2.42 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $25,500.

Contract dated, September 8, 1906.

Work commenced, September 19, 1906.

Work completed, November 2, 1907.

Final account, $28,848.45.

Contractor, The Good Roads Construction Co.

Engineer in charge, Wm. C. Perkins.

This improvement extends from the city line of Niagara Falls to the R. W. & O. R. R. crossing, near the village line of Lewiston.

Under date of May 28, 1907, a supplemental agreement was entered into whereby the thickness of the above-named road was increased, by adding a 3-inch course of quarry chips and spalls, to be used as a subbase. This was done to meet the wishes of the Board of Supervisors of Niagara county.

On September 10, 1907 and November 20, 1907, supplemental agreements were entered into between the State and contractors for extra work performed on the above road.

FAIRPORT (SECTION 2) ROAD, NO. 479, MONROE COUNTY.

Length, 0.27 mile.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $3,700.

Contract dated, November 26, 1907.

Work commenced, May 1, 1908.

Work completed, May 28, 1908.

Final account, $3,427.23.

Contractor, Arthur J. Rockwood.

Engineer in charge, M. S. Smith.

This road extends from Basket street easterly to the Erie canal in the town of Perinton. The contract was originally let to Patrick A. Lillis, but was assigned to Arthur J. Rockwood on February 13, 1908.

TRANSIT (SECTION 3) ROAD, NO. 507, NIAGARA COUNTY.

Length, 4.68 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $48,000.

Contract dated, July 9, 1906.

Work commenced, August 6, 1906.

Work completed, May 30, 1908.

Final account, $39,981.73.

Contractor, Baldwin Contracting Co.

Engineers in charge, C. J. Bean and Wm. C. Perkins.

This improvement extends from the south line of the city of

Lockport southerly to Tonawanda creek, in the towns of Lockport and Pendleton.

On September 10, 1907, supplemental agreement entered into covering Telford foundation not called for in the plans, made necessary on account of clay subgrade between Stations 142 and 147.

On March 19, 1907, Wm. E. Baldwin & Co., to whom the contract was originally let, assigned this road to the Baldwin Contracting Co., of Buffalo, N. Y.

EAST PEMBROKE–BATAVIA ROAD, NO. 586, GENESEE COUNTY.

Length, 5.58 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $49,000.

Contract dated, June 30, 1906.

Work commenced, October 30, 1906.

Work completed, July 25, 1908.

Final account, $42,559.15.

Contractor, Frederick W. Knickenberg.

Engineers in charge, George C. Andrews and C. H. Fosdick.

This improvement extends from the west village line of Batavia westerly to the east line of Pembroke, in the town of Batavia.

CONTRACTS PENDING SEPTEMBER 30, 1908.

CHILI (SECTION 1) ROAD, NO. 254, MONROE COUNTY.

Length, 3.11 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $27,700.

Contract dated, July 11, 1906.

Work commenced, May 9, 1908.

Work completed, 97 per cent.

Contractor, Frederick A. Brotsch.

Engineers in charge, George G. Miller and Job Rogers.

This improvement extends from the western boundary of the city of Rochester southwesterly to the line between the towns of Gates and Chili. The original plans contemplated building this

road in two equal courses, of limestone three inches thick when rolled; however, on May 8, 1908, a supplemental agreement was entered into changing from a two-course to a three-course road, increasing the thickness of macadam three inches. This was done to meet the wishes of the Monroe county Board of Supervisors.

CHILI (SECTION 2) ROAD, NO. 255, MONROE COUNTY.

Length, 2.56 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $26,000.

Contract dated, July 11, 1906.

Work commenced, July 25, 1908.

Work completed, 64 per cent.

Contractor, Frederick A. Brotsch.

Engineers in charge, George G. Miller and Job Rogers.

This improvement extends from the southern line of the town of Gates southwesterly to the village of Chili, in the town of Chili. The original plans contemplated constructing this road of limestone, built in two equal courses three inches thick when rolled. On May 8, 1908, a supplemental agreement was entered into between the State and the contractor, increasing the thickness of macadam three inches, changing the road from a two-course to a three-course road. This was done in accordance with the wishes of the Board of Supervisors of Monroe county.

LEFT FORK–GERMAN CHURCH–REDMAN ROAD, NO. 286, MONROE COUNTY.

Length, 5.55 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $40,300.

Contract dated, September 20, 1907.

Work commenced, June 13, 1908.

Work completed, 58 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineer in charge, Elmer E. Kidder.

This road extends from the Hamlin road 5.55 miles northerly and westerly to the Cook road, in the town of Hamlin.

CLOVER STREET (SECTION 1) ROAD, NO. 294, MONROE COUNTY.

Length, 5.89 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $44,900.

Contract dated, September 17, 1907.

Work commenced, September 25, 1907.

Work completed, 91 per cent.

Contractor, Monroe Roads Co.

Engineer in charge, Wilson G. Harger.

This road extends from Monroe avenue southerly to the southern line of the town of Pittsford, in the towns of Brighton and Pittsford.

WELLSBURG ROAD, NO. 355, CHEMUNG COUNTY.

Length, 4.51 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $61,000.

Contract dated, March 9, 1908.

Work commenced, May 26, 1908.

Work completed, 60 per cent.

Contractors, Albertson and Adams.

Engineer in charge, James T. Schuyler.

This road extends from the south line of the city of Elmira southeasterly to the village of Wellsburg, in the towns of Southport and Ashland.

The contract for this road was originally let to Bennett and Ryan, but was assigned to Albertson and Adams on March 9, 1908.

HORSEHEADS–CORNING ROAD, NO. 358, CHEMUNG COUNTY.

Length, 7.14 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $80,600.

Contract dated, December 2, 1907.

Work commenced, May 23, 1908.

Work completed, 81 per cent.

Contractors, Casey and Murray.

Engineer in charge, James Schuyler.

This road extends from the west line of the village of Horseheads to the west line of the county of Chemung, in the towns of Horseheads and Big Flats.

CLINTON STREET (SECTION 1) ROAD, NO. 371, ERIE COUNTY.

Length, 5.65 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $55,900.

Contract dated, July 18, 1906.

Work commenced, August 6, 1906.

Work completed, 98 per cent.

Contractor, Gantz–Wilson Construction Co.

Engineers in charge, W. T. Huber, John S. Clancy and Wm. Ward.

This improvement extends from the east line of the city of Buffalo 5.65 miles easterly to the west line of the town of Elma. The original plans contemplated the construction of this road entirely of limestone, but under date of April 11, 1907, a supplemental agreement was entered into, providing for the substitution of brick pavement from Station 0+10 to Station 150+50, in place of the macadam originally planned. This change was made on account of the large amount of traffic on this road and the unstable foundation which was found when the road was started.

CLINTON STREET (SECTION 2) ROAD, NO. 372, ERIE COUNTY.

Length, 6.14 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $61,500.

Contract dated, July 18, 1906.

Work commenced, July 2, 1907.

Work completed, 40 per cent.

Contractor, Gantz–Wilson Construction Co.

Engineers in charge, John S. Clancy and John F. Hussey.

This improvement extends from the east line of the town of West Seneca easterly to the west line of the town of Marilla, in the town of Elma. The original plans contemplated a macadam roadway; however, the traffic passing over this highway was of such character and volume that a macadam surface was deemed insufficient to withstand the wear and it was deemed advisable to provide for a brick pavement from Station 295+25 to Station 622+53. Supplemental agreement for this work was entered into on May 27, 1908.

GOODRICH ROAD, No. 373, ERIE COUNTY.

Length, 8.77 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $84,400.

Contract dated, July 9, 1906.

Work commenced, April 8, 1907.

Work completed, 84 per cent.

Contractor, Baldwin Contracting Co.

Engineers in charge, H. J. Simmelink, Chas. A. Carruth and R. W. Heerlein.

This improvement extends from the Main street road to Tonawanda creek, in the town of Clarence.

The contract was originally let to Wm. E. Baldwin & Co., but on March 19, 1907, it was assigned to the Baldwin Contracting Co., of Buffalo, N. Y.

On May 7, 1908, the Board of Supervisors of Erie county passed a resolution requesting that from the creek south of Clarence Center (Station 152+50) to the N. Y. C. railroad tracks (Station 176+71) the 8-foot cobble gutter be omitted and eight feet of additional macadam be added on each side of the roadway, with concrete curbs and proper drainage, and that the drains west of the road be lengthened through private lands. A supplemental agreement covering this work was entered into on May 16, 1908.

FIVE CORNERS–KUCKVILLE (SECTION 2) ROAD, No. 387, ORLEANS COUNTY.

Length, 5.80 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,500.

Contract dated, August 31, 1906.

Work commenced, April 9, 1907.

Work completed, 86 per cent.

Contractor, Thomas Hucknall.

Engineers in charge, I. O. Cole and C. M. Colony.

This improvement extends from the south line of the town of Carlton northerly to Johnson's creek, in the town of Carlton.

MAPLE RIDGE (SECTION 1) ROAD, NO. 389, ORLEANS COUNTY.

Length, 3.08 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $21,600.

Contract dated, September 27, 1907.

Work commenced, July 20, 1908.

Work completed, 50 per cent.

Contractor, Fred W. Knickenberg.

Engineer in charge, H. C. Hutchins.

This road extends from the east line of the village of Medina to the east line of the town of Shelby, in the town of Shelby.

MAPLE RIDGE (SECTION 2) ROAD, NO. 390, ORLEANS COUNTY.

Length, 2.8 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $19,000.

Contract dated, September 27, 1907.

Work commenced, July 20, 1908.

Work completed, 50 per cent.

Contractor, Fred W. Knickenberg.

Engineer in charge, H. C. Hutchins.

This road extends from the west line of the village of Medina westerly to the line between the counties of Orleans and Niagara, in the town of Shelby.

CLARENDON–HOLLEY ROAD, NO. 391, ORLEANS COUNTY.

Length, 4.54 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $31,600.

Contract dated, December 4, 1907.

Work commenced, July 15, 1908.

Work completed, 83 per cent.

Contractor, Greece Construction Co.

Engineer in charge, L. R. Barnes.

This road extends from the south line of the town of Murray to Robinson's schoolhouse, in the town of Clarendon.

COUNTY LINE ROAD, NO. 398, MONROE AND ORLEANS COUNTIES.

Length, 5.53 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,500.

Contract dated, January 18, 1908.

Work not started.

Contractor, Stewart–Kerbaugh–Shanley Co.

This road extends from Troutberg southerly along the line between the counties of Monroe and Orleans to the south line of the town of Hamlin, in the towns of Hamlin, Kendall and Murray.

LATTA ROAD, NO. 399, MONROE COUNTY.

Length, 6.84 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $82,000.

Contract dated, September 19, 1907.

Work commenced, March 15, 1908.

Work completed, 98 per cent.

Contractor, Jeremiah T. Finch.

Engineers in charge, George G. Miller, J. W. Howe and E. P. Strowger.

This road extends from the west line of the village of Charlotte westerly to the east line of the town of Parma, in the town of Greece.

BUFFALO (SECTION 3) ROAD, NO. 402, MONROE COUNTY.

Length, 3.62 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $32,300.

Contract dated, December 4, 1907.

Work commenced, May 1, 1908.

Work completed, 99 per cent.

Contractor, Greece Construction Co.

Engineer in charge, M. A. Finch.

This road extends between the towns of Gates and Ogden southwesterly to the line between the towns of Riga and Chili, in the towns of Chili and Ogden.

Supplemental agreement dated September 2, 1908, was entered into, covering the application of "Asphaltoiline" to the surface of this road.

CHURCHVILLE–RIGA ROAD, NO. 403, MONROE COUNTY.

Length, 2.08 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $20,100.

Contract dated, November 26, 1907.

Work commenced, July 18, 1908.

Work completed, 26 per cent.

Contractors, Rockefeller Bros.

Engineer in charge, M. A. Finch.

This road extends from the south line of the village of Churchville southerly to the cross-roads at Riga Center in the town of Riga.

The contract for this road was originally let to Patrick A. Lillis, but was assigned to Rockefeller Bros. on June 8, 1908.

On July 1, 1908, the Board of Supervisors of Monroe county passed a resolution asking that the width of macadam be changed from 12 to 14 feet. Special agreement covering this change was entered into July 25, 1908.

CLOVER STREET (SECTION 2) ROAD, NO. 474, MONROE COUNTY.

Length, 1.95 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $17,200.

Contract dated, November 26, 1907.

Work commenced, June 20, 1908.

Work completed, 95 per cent.

Contractor, A. J. Rockwood.

Engineer in charge, E. P. Strowger.

This road extends from the Monroe avenue road northerly to the East avenue road, in the town of Brighton.

The contract for this road was originally let to Patrick A. Lillis, but on February 13, 1908, it was assigned to A. J. Rockwood.

WEST BLOOMFIELD–HONEOYE FALLS ROAD, NO. 485, ONTARIO COUNTY.

Length, 3.76 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $32,900.

Contract dated, January 20, 1908.

Work commenced, May 30, 1908.

Work completed, 91 per cent.

Contractor, H. P. Burgard Co.

Engineer in charge, John Philo Kelley.

This road extends from the east line of the county of Livingston southeasterly to West Bloomfield, in the town of West Bloomfield.

HAMBURG–NORTH COLLINS ROAD, NO. 523, ERIE COUNTY.

Length, 8.86 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $114,900.

Contract dated, July 9, 1906.

Work commenced, July 7, 1907.

Work completed, 83 per cent.

Contractor, Baldwin Contracting Co.

Engineers in charge, E. J. Simmelink and C. A. Rice.

This improvement extends from the south line of the village of Hamburg southwesterly to the north line of the town of North Collins, in the towns of Hamburg and Eden.

The contract for this road was originally let to Wm. E. Baldwin & Co., but was assigned to the Baldwin Contracting Co. on March 19, 1907.

On April 7, 1908, the Board of Supervisors of Erie county passed a resolution requesting the State Engineer to lower the grade between Stations 145 and 172. Supplemental agreements covering this change were passed by the Board of Supervisors June 23, 1908.

NORTH COLLINS–LAWTON ROAD, NO. 524, ERIE COUNTY.

Length, 5.43 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $73,900.

Contract dated, September 17, 1907.

Work commenced, April 11, 1908.

Work completed, 93 per cent.

Contractors, Mosier and Summers.

Engineers in charge, Wm. C. Perkins, R. A. Gross and J. H. Huber.

This road extends from the south line of the town of Eden southerly to the north line of the town of Collins, in the town of North Collins.

LAWTON–GOWANDA ROAD, NO. 525, ERIE COUNTY.

Length, 4 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $46,900.

Contract dated, September 20, 1907.

Work commenced, April 11, 1908.

Work completed, 69 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineer in charge, A. R. Erskine,

This road extends from the south line of the town of North Collins southerly to the north line of the village of Gowanda, in the town of Collins.

COLLINS–MORTON'S CORNERS (SECTION 1) ROAD, NO. 526, ERIE COUNTY.

Length, 4.01 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $37,300.

Contract dated, September 20, 1907.

Contractor, Stewart–Kerbaugh–Shanley Co.

This road extends from its intersection with the Lawton–Gowanda road easterly to Collins Center, in the town of Collins.

The contractor has done no work on this road to date.

HAMBURG–SPRINGVILLE (SECTION 1) ROAD, NO. 527, ERIE COUNTY.

Length, 9.47 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $87,500.

Contract dated, September 20, 1907.

Contractor, Stewart–Kerbaugh–Shanley Co.

This road extends from the east line of the village of Hamburg southeasterly to the north line of the town of Concord, in the towns of Hamburg and Boston.

No work has been done on this road to date.

HAMBURG–SPRINGVILLE (SECTION 2) ROAD, NO. 528, ERIE COUNTY.

Length, 7.34 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $66,500.

Contract dated, September 20, 1907.

Work commenced, June 13, 1908.

Work completed, 22 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineers in charge, R. A. Gross and Hall Gleason.

This road extends from the south line of the town of Boston southerly to the village of Springville, in the town of Concord.

ALDEN–TOWN LINE AND CLINTON STREET–MARILLA ROAD, NO. 529, ERIE COUNTY.

Length, 3.55 and 2.47 miles.

Width of macadam, 12 and 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $49,000.

Contract dated, September 20, 1907.

Work commenced, June 20, 1908.

Work completed, 65 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineers in charge, T. J. Smith and D. T. Simpson.

This road extends from the west line of the village of Alden westerly to the Town Line road, a distance of 3.55 miles in the town of Alden, and from the east line of the town of Elma, easterly and southerly to Marilla, a distance of 2.47 miles in the town of Marilla.

BASE LINE–GRAND ISLAND (SECTION 1) ROAD, NO. 530, ERIE COUNTY.

Length, 1.81 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $14,000.

Contract dated, September 20, 1907.

Work commenced, June 6, 1908.

Work completed, 91 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineers in charge, W. G. White and T. J. Smith.

This road extends from the Niagara river westerly and northerly to Warrendale, in the town of Grand Island.

BASE LINE–GRAND ISLAND (SECTION 2) ROAD, NO. 531, ERIE COUNTY.

Length, 2.59 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $19,800.

Contract dated, December 18, 1907.

Work commenced, July 2, 1908.

Work completed, 51 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineer in charge, W. G. White.

This road extends from Warrendale northerly to Inland, in the town of Grand Island.

BASE LINE–GRAND ISLAND (SECTION 3) ROAD, NO. 532, ERIE COUNTY.

Length, 1.87 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $11,400.

Contract dated, December 18, 1907.

Work commenced, July 11, 1908.

Work completed, 91 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineers in charge, W. G. White, T. J. Smith and H. R. Breese.

This road extends from Inland northerly to Wood creek, in the town of Grand Island.

SKINNERSVILLE–NEW HOME BRIDGE ROAD, NO. 584, ERIE COUNTY.

Length, 7.96 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $87,700.

Contract dated, May 8, 1908.

Work commenced, June 6, 1908.

Work completed, 74 per cent.

Contractor, Henry P. Burgard.

Engineer in charge, John S. Clancy.

This road extends from its intersection with the Main street road northerly to Tonawanda creek, in the town of Amherst.

This contract was originally let to the Stewart–Kerbaugh–Shanley Co., but on May 7, 1908, the road was assigned to Henry P. Burgard, of Buffalo.

OLEAN–ALLEGANY (SECTIONS 1 AND 2) ROAD, NO. 601, CATTARAUGUS COUNTY.

Length, 2.31 and 0.78 miles.

Width of macadam, 16 and 20 feet.

Engineer's preliminary estimate of total cost, including engineering, $39,000.

Contract dated, September 24, 1907.

Work commenced, August 8, 1908.

Work completed, 27 per cent.

Contractor, Gantz–Wilson Construction Co.

Engineer in charge, B. E. Moses.

This road extends from the junction of the Five-Mile and Nine-Mile roads southeasterly to the west line of the town of Olean, a distance of 2.31 miles in the town of Allegany and from the east line of the town of Allegany easterly to the west line of the city of Olean, a distance of 0.78 mile in the town of Olean.

MANCHESTER–CLIFTON SPRINGS ROAD, NO. 607, ONTARIO COUNTY.

Length, 4.35 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $26,600.

Contract dated, December 18, 1907.

Work commenced, May 30, 1908.

Work completed, 55 per cent.

Contractor, Gantz–Wilson Construction Co.

Engineer in charge, John Philo Kelley.

This road extends from the northerly line of the village of Clifton Springs westerly to the east line of the village of Manchester, in the town of Manchester.

PHELPS–CLIFTON SPRINGS ROAD, NO. 608, ONTARIO COUNTY.

Length, 2.21 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $12,700.

Contract dated, December 18, 1907.

Work commenced, May 30, 1908.

Work completed, 86 per cent.

Contractor, Gantz–Wilson Construction Co.

Engineer in charge, John Philo Kelley.

This road extends from the west line of the village of Phelps westerly to the east line of the village of Clifton Springs, in the town of Phelps.

LEWISTON–DICKERSONVILLE ROAD, NO. 617, NIAGARA COUNTY.

Length, 4.80 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $35,000.

Contract dated, September 20, 1907.

Work commenced, June 6, 1908.

Work completed, 76 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineer in charge, Wm. C. Perkins.

This road extends from the east line of the village of Lewiston easterly to Dickersonville (except through the Tuscarora Indian Reservation), in the town of Lewiston.

MT. MORRIS–GENESEO ROAD, NO. 622, LIVINGSTON COUNTY.

Length, 5.20 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $49,200.

Contract dated, September 20, 1907.

Contractor, Stewart–Kerbaugh–Shanley Co.

This road extends from the northeast line of the village of Mt. Morris northeasterly to the south line of the village of Geneseo, in the towns of Mt. Morris, Groveland and Geneseo.

No work done on this road to date.

GENESEO–AVON ROAD, NO. 623, LIVINGSTON COUNTY.

Length, 6.99 miles.

Width of macadam, 14 feet.

Engineer's preliminary estimate of total cost, including engineering, $60,500.

Contract dated, December 18, 1907.

Work commenced, May 9, 1908.

Work completed, 42 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineer in charge, M. S. Smith.

This road extends from the north line of the village of Geneseo northerly to the south line of the village of Avon, in the towns of Geneseo and Avon.

NORTH TONAWANDA–SANBORN ROAD, NO. 643, NIAGARA COUNTY.

Length, 4.44 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $43,200.

Contract dated, December 18, 1907.

Work commenced, May 23, 1908.

Work completed, 69 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineer in charge, Wm. C. Perkins.

This road extends from the north line of the city of North Tonawanda northerly to the south line of the town of Lewiston, in the town of Wheatfield.

GRISWOLD STREET–BRATT'S BRIDGE ROAD, NO. 660, NIAGARA COUNTY.

Length, 5.98 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $72,400.

Contract dated, December 18, 1907.

Work commenced, June 6, 1908.

Work completed, 23 per cent.

Contractor, Stewart–Kerbaugh–Shanley Co.

Engineers in charge, Wm. C. Perkins and M. W. Williams.

This road extends from the southern end of the Griswold street road improvement southerly to Bratt's Bridge over Tonawanda creek, in the town of Royalton.

OTTO–CATTARAUGUS ROAD, NO. 695, CATTARAUGUS COUNTY.

Length, 1.21 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $12,600.

Contract dated, February 2, 1908.

Work commenced, June 13, 1908.

Work completed, 76 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineers in charge, B. E. Moses and H. W. Driher.

This road extends from the east line of the village of Cattaraugus northerly to the south line of the town of Otto, in the town of New Albion.

OTTO–EAST OTTO (SECTION 1) ROAD, NO. 696, CATTARAUGUS COUNTY.

Length, 4.10 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $41,500.

Contract dated, February 11, 1908.

Work commenced, July 1, 1908.

Work completed, 5 per cent.

Contractor, Stewart–Kerbaugh–Shanley Company.

Engineer in charge, H. W. Driher.

This road extends from the north line of the town of New Albion northerly and easterly to the south line of the town of East Otto, in the town of Otto.

OTTO–EAST OTTO (SECTION 2) ROAD, NO. 697, CATTARAUGUS COUNTY.

Length, 2.27 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $20,500.

Contract dated, February 11, 1908.

Work commenced, June 27, 1908.

Work completed, 68 per cent.

Contractor, Stewart-Kerbaugh-Shanley Company.

Engineer in charge, H. W. Driher.

This road extends from the north line of the town of Otto easterly and southerly to the Baptist church in the village of East Otto, in the town of East Otto.

FALCONER-KENNEDY ROAD, NO. 698, CHAUTAUQUA COUNTY.

Length, 1.044 miles.

Width of macadam, 12 feet.

Engineer's preliminary estimate of total cost, including engineering, $11,500.

Contract dated, February 5, 1908.

Work commenced, July 18, 1908.

Work completed, 53 per cent.

Contractor, E. M. Love & Company.

Engineer in charge, S. O. Steere.

This road extends from the village of Falconer easterly to the lines between the towns of Ellicott and Poland, in the town of Ellicott.

PORTVILLE-OLEAN (SECTION 1) ROAD, NO. 730, CATTARAUGUS COUNTY.

Length, 3.46 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $39,900.

Contract dated, January 3, 1908.

No work done to date.

Contractor, Star Contracting Company.

This road extends from the east line of the town of Olean 4.1 miles (excepting through the village of Portville) making a distance of 3.46 miles to be improved; all in the town of Portville.

PORTVILLE–OLEAN (SECTION 2) ROAD, NO. 731, CATTARAUGUS COUNTY.

Length, 2.06 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $25,800.

Contract dated, January 30, 1908.

Work commenced, September 18, 1908.

Work completed, 28 per cent.

Contractor, Star Contracting Company.

Engineer in charge, Joseph W. Howe.

This road extends from the east line of the city of Olean southeasterly to the west line of the town of Portville, in the town of Olean.

BIG FLATS–GIBSON ROAD, NO. 742, STEUBEN COUNTY.

Length, 4.33 miles.

Width of macadam, 16 feet.

Engineer's preliminary estimate of total cost, including engineering, $56,200.

Contract dated, January 30, 1908.

Work commenced, May 15, 1908.

Work completed, 93 per cent.

Contractors, Bradley and Nolan.

Engineer in charge, James Schuyler.

This road extends from the line between the counties of Steuben and Chemung northwesterly to the Chemung river, in the town of Corning.

A supplemental agreement was entered into July 21, 1908, to put in a cobble sub-base course 6 inches thick and 16 feet wide between Stations 565 and 605+25 through the hamlet of Gibson, on account of unstable foundation found between these stations.

HIGHWAY REPAIRS.

The following roads were repaired during the fiscal year, as far as the money available would permit:

Buffalo–Hamburg road, No. 2, Erie county.

East Avenue road, No. 5, Monroe county.

Ridge (section 1) road, No. 6, Monroe county.

Southport (sections 1, 2 and 3) roads, Nos. 13, 28 and 29, Chemung county.

South Broadway road, No. 30, Chemung county.

Fairport road, No. 60, Monroe county.

West Henrietta road, No. 62, Monroe county.

Scottsville (section 1) road, No. 63, Monroe county.

Orchard Park (section 3) road, No. 67, Erie county.

Main Street (section 1) road, No. 69, Erie county.

Clifton (section 1) road, No. 78, Monroe county.

Scottsville (section 2) road, No. 79, Monroe county.

Hamlin (section 1) road, No. 80, Monroe county.

Hamlin (section 2) road, No. 81, Monroe county.

Buffalo (section 2) road, No. 83, Monroe county.

Big Tree road, No. 86, Erie county.

Main Street (section 2) road, No. 87, Erie county.

Transit (section 1) road, No. 88, Erie county.

Transit (section 2) road, No. 89, Erie county.

Monroe Avenue road, No. 94, Monroe county.

Webster (sections 1, 2 and 3) roads, Nos. 98, 99 and 100, Monroe county.

Aurora–Buffalo road, No. 128, Erie county.

Main Street (sections 3 and 4) roads, Nos. 130 and 131, Erie county.

Geneva–Canandaigua (section 1) road, No. 146, Ontario county.

Little Ridge (section 2) road, No. 165, Monroe county.

Dugway (sections 1 and 2) roads, Nos. 168 and 169, Monroe county.

Lake road, No. 171, Monroe county.

Portland Avenue (section 1) road, No. 172, Monroe county.

Bristol road, No. 187, Ontario county.

Bristol Valley road, No. 188, Ontario county.

Geneva–Canandaigua (section 2) road, No. 207, Ontario county.

Griswold Street road, No. 251, Niagara county.

Little Ridge (section 4) road, No. 257, Monroe county.

Erin–Horseheads road, No. 356, Chemung county.

Grand Central Avenue (section 1) road, No. 357, Chemung county.

Five Corners–Kuckville (section 1) road, No. 386, Orleans county.

Fairport (section 2) road, No. 479, Monroe county.

Dansville–Mt. Morris road, No. 482, Livingston county.

An itemized statement of the repairs made to these roads will be found under table "Maintenance and Repairs of Improved Public Highways," included in this annual report.

On July 8 and 9, 1908, the American Automobile Association called the First Annual Good Roads and Legislative Convention, at Buffalo, N. Y., the State Engineer's Department having charge of that part of the convention devoted to the Improvement of Highways, their maintenance, etc. One mile of "Asphaltoiline" was laid free without cost to the State, to demonstrate the practicability of this product. Three miles of "Tarvia" and 750 sq. ft. of Rock Asphalt were laid prior to the time of the convention.

Six miles of "Asphaltoiline" have been laid by the State in Erie county and two miles of "Vitovia" in Monroe county.

In closing, I desire to thank you and your deputies for the consideration shown me. I also desire to thank the employees of the Western Division for the faithful and efficient manner in which they have performed their duties.

Respectfully submitted,

JOHN P. KELLEY,

Division Engineer.

THE FOLLOWING STATEMENTS SHOW THE NAMES, RANK AND COMPENSATION OF ENGINEERS IN THE WESTERN DIVISION OF THE DEPARTMENT OF THE STATE ENGINEER AND SURVEYOR, TOGETHER WITH INCIDENTAL EXPENSES FOR THE FISCAL YEAR ENDED SEPTEMBER 30, 1908.

Ordinary Repairs to Canals — Erie Canal.

Chapter 577, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
John P. Kelly	Division engineer	$300 per month	$3,600 00	$118 00	$3,718 00
J. B. Barrett	Leveler	5 00 per day	780 00		780 00
Peter Sheridan	Financial clerk	5 00 per day	150 00	97 48	247 48
Frank J. Kennedy	Financial clerk	5 00 per day	305 00	1 88	306 88
A. B. Williams	Estimate clerk	126 per month	126 00		126 00
Anna M. Lorscheider	Stenographer	1,000 per year	1,000 00		1,000 00
M. Madden	Stenographer	2 00 per day	52 00		52 00
					$6,230 36
Incidental Expenses.					
Stationery and printing				$102 77	
Postage				04	
Office rent				705 00	
Telephone and telegragh				155 76	
Miscellaneous				1,301 68	
Livery				6 00	
					2,271 25
Total					$8,501 61

Construction of Barge Canal — Erie Canal.

Chapter 147, Laws of 1903; chapter 143, Laws of 1905; chapter 172, Laws of 1907.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
John P. Kelly	Division engineer	$300 per month		$284 91	$284 91
R. J. Marcher	Resident engineer	200 per month	$651 61	10 91	662 52
Geo. T. Keith	Resident engineer	200 per month	400 00	23 53	423 53
Thos W. Barrally	Resident engineer	200 per month	2,600 00	356 66	2,956 66
B. E. Failing	Resident engineer	200 per month	2,400 00	315 42	2,715 42
Thos J. Morrison	Resident engineer	200 per month	2,200 00	130 28	2,330 28
Chas. A. Ingersoll	Resident engineer	200 per month	2,200 00	207 88	2,407 88
Chas. J. McDonough	First assistant engineer	7 00 per day	2,373 00	337 69	2,710 69
Thos. J. Morrison	First assistant engineer	7 00 per day	98 00	2 93	100 93
Frank T. Marsh	Assistant engineer	6 00 per day	1,878 00	11 20	1,889 20
H. J. Hemstreet	Assistant engineer	6 00 per day	1,902 00	160 39	2,062 39
Chas. A. Ingersoll	Assistant engineer	6 00 per day	312 00	2 15	314 15
John H. Huber	Assistant engineer	6 00 per day	1,044 00	1 53	1,045 53
Lewis G. Fisher	Assistant engineer	6 00 per day	1,884 00	332 91	2,216 91
Arthur S. Whitbeck	Assistant engineer	6 00 per day	1,296 00	223 93	1,519 93
Joseph H. Young	Assistant engineer	6 00 per day	1,146 00	6 62	1,152 62
A. L. Simmons	Assistant engineer	6 00 per day	30 00	20 54	50 54
J. Seward Summers	Assistant engineer	6 00 per day	234 00	21 94	255 94
Geo. C. Mills	Assistant engineer	6 00 per day	1,596 00	1,556 04	3,152 04
Fredrick J. Wilbur	Assistant engineer	6 00 per day	330 00	10 70	340 70
J. Seward Summers	Assistant engineer	5 00 per day	1,180 00	132 51	1,312 51
Geo. C. Mills	Assistant engineer	5 00 per day	416 00	1 62	417 62
F. J. Wilbur	Assistant engineer	5 00 per day	1,350 00	32 72	1,382 72
R. H. Merrill	Assistant engineer	5 00 per day	1,570 00	96 58	1,666 58
Hall Gleason	Assistant engineer	5 00 per day	1,205 00	221 55	1,426 55

Construction of Barge Canal — Erie Canal — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Arthur S. Millinowski	Assistant engineer	$5 00 per day	$840 00	$105 37	$945 37
Geo. Kellogg	Assistant engineer	5 00 per day	260 00	102 90	362 90
W. A. Kemper	Assistant engineer	5 00 per day	999 50	8 41	1,007 91
Jas. T. Schuyler	Assistant engineer	5 00 per day	440 00	5 06	445 06
Elmer C. Lawton	Assistant engineer	5 00 per day	1,570 00	492 95	2,062 95
Smith O. Steere	Assistant engineer	5 00 per day	105 00	3 90	108 90
H. R. Wickham	Assistant engineer	5 00 per day	495 00	....	495 00
Elias H. Anderson	Assistant engineer	5 00 per day	500 00	149 19	649 19
B. L. G. Rees	Assistant engineer	5 00 per day	45 00	6 17	51 17
Chas. L. Henderson	Assistant engineer	5 00 per day	35 00	36 92	71 92
O. L. Burdett	Assistant engineer	5 00 per day	45 00	7 62	52 62
Peter Sheridan	Financial clerk	5 00 per day	650 00	....	650 00
A. B Williams	Estimate clerk	4 50 per day	207 00	....	207 00
A. B. Williams	Estimate clerk	126 per month	504 00	....	504 00
F. V. Searls	Estimate clerk	4 50 per day	416 00	1 65	417 65
F. V. Searls	Estimate clerk	126 per month	1,134 00	5 03	1,139 03
Myer Abramson	Junior clerk	40 per month	233 33	....	233 33
Elias H. Anderson	Leveler	4 50 per day	1,075 50	37 25	1,112 75
Arthur S. Millinowski	Leveler	4 50 per day	652 50	86	653 36
L. R. Barnes	Leveler	4 50 per day	526 50	2 17	528 67
Geo. S. Haight	Leveler	4 50 per day	414 00	....	414 00
Harold N. Metzger	Leveler	4 50 per day	414 00	170 56	584 56
Smith O. Steere	Leveler	4 50 per day	535 50	7 97	543 47
H. T. Arnold	Leveler	4 50 per day	414 00	90 27	504 27
Albert R. Erskine	Leveler	4 50 per day	346 50	82 97	429 47
H. R. Wickham	Leveler	4 50 per day	441 00	....	441 00
Walter H. Clawson	Leveler	4 50 per day	652 50	7 00	659 50
Francis W. Madigan	Leveler	4 50 per day	688 50	464 31	1,152 81
C. L. Baldwin	Leveler	4 50 per day	409 50	....	409 50
Daniel W. Overocker	Leveler	4 50 per day	297 00	....	297 00
Edgar W. Maloney	Leveler	4 50 per day	414 00	....	414 00
Edward H. Bourne	Draftsman	5 00 per day	195 00	3 92	198 92
Edward A. Zorsch	Draftsman	5 00 per day	1,495 00	....	1,495 00
Wm. H. Dernell	Draftsman	4 50 per day	234 00	....	234 00
Chas. R. Zorsch	Draftsman	4 50 per day	1,345 50	....	1,345 50
Daniel W. Overocker	Draftsman	4 00 per day	564 00	....	564 00
F. H. Rawson	Draftsman	4 00 per day	80 00	....	80 00
Francis W. Madigan	Draftsman	4 00 per day	432 00	3 20	435 20
James Galvin	Draftsman	4 00 per day	272 00	5 96	277 96
M. A. Finch	Draftsman	4 00 per day	368 00	....	368 00
H. R. Wickham	Draftsman	4 00 per day	132 00	....	132 00
Chas. J. Alber	Draftsman	4 00 per day	928 00	8 65	936 65
Sidney L. George	Draftsman	4 00 per day	200 00	....	200 00
Harry M. Nelson	Draftsman	4 00 per day	632 00	84 39	716 39
Edgar W. Maloney	Draftsman	4 00 per day	340 00	....	340 00
E. J. Sipple	Draftsman	4 00 per day	96 00	18 83	114 83
Wm. H. Dernell	Draftsman	4 00 per day	724 00	13 20	737 20
H. Clyde Roe	Draftsman	4 00 per day	1,256 00	....	1,256 00
A. B. Chappell	Draftsman	4 00 per day	1,252 00	19 90	1,271 90
Harold N. Metzger	Draftsman	4 00 per day	320 00	....	320 00
H. H. Stickney, Jr.	Draftsman	4 00 per day	684 00	....	684 00
Geo. S. Haight	Draftsman	4 00 per day	288 00	....	288 00
Chas. R. Waters	Draftsman	4 00 per day	32 00	9 71	41 71
E. C. Getty	Draftsman	4 00 per day	32 00	9 58	41 58
H. S. Prokaw	Draftsman	4 00 per day	24 00	8 33	32 33
G. Gale Dixon	Draftsman	4 00 per day	628 00	....	628 00
Frank W. Blair	Draftsman	4 00 per day	612 00	8 28	620 28
Geo. C. Britton	Draftsman	4 00 per day	316 00	....	316 00
John J. McManus	Foreman of borings	4 50 per day	478 00	150 71	628 71
John J. McManus	Foreman of borings	3 50 per day	570 50	65 06	635 56
Fred. H. Palmer	Foreman of borings	3 50 per day	1,187 50	1 58	1,189 08
H. Kramer	Foreman of borings	3 50 per day	637 00	69 20	706 20
Thos. H. Bowes	Foreman of borings	3 50 per day	122 50	40 75	163 25
Stephen Hurlsh	Boatman	3 00 per day	261 00	....	261 00
F. L. Swift	Boatman	3 00 per day	342 00	253 67	595 67
D. S. Hollenbeck	Boatman	3 00 per day	1,017 00	....	1,017 00
Wm. McGrath	Boatman	3 00 per day	414 00	....	414 00
Wm. F. Guenther	Boatman	3 00 per day	384 00	....	384 00
Wm. Furman	Boatman	3 00 per day	24 00	21 32	45 32
F. H. Carroll	Axeman	2 00 per day	234 00	59 37	293 37
F. J. O'Connor	Axeman	2 00 per day	508 00	12 30	520 30
Wm. J. Berdel	Axeman	2 00 per day	494 00	7 60	501 60
Chas. Watson	Axeman	2 00 per day	82 00	....	82 00
Jerome J. Brueckel	Axeman	2 00 per day	572 00	67 15	639 15
Harry J. O'Connor	Axeman	2 00 per day	266 00	....	266 00

Construction of Barge Canal — Erie Canal — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Jno. J. Sullivan	Axeman	$2 00 per day	$336 00	$25 76	$361 76
L. R. Bickford	Axeman	2 00 per day	280 00	5 25	285 25
Philip D. Ungerer	Axeman	2 00 per day	146 00		146 00
Frank N. Sisson	Axeman	2 00 per day	298 00		298 00
Geo. E. Merry	Axeman	2 00 per day	202 00		202 00
Wm. H. Kingston	Axeman	2 00 per day	396 00	37 25	433 25
Herman A. Schroedel	Axeman	2 00 per day	82 00	12 50	94 50
Paul Howe	Axeman	2 00 per day	572 00	53 10	625 10
H. C. Snelgrove	Axeman	2 00 per day	260 00		260 00
Frank J. O'Neil	Axeman	2 00 per day	92 00		92 00
Geo. Davis	Axeman	2 00 per day	574 00		574 00
Geo. F. Poinan	Axeman	2 00 per day	26 00		26 00
Edward P. Boyle	Axeman	2 00 per day	262 00		262 00
John J. Kinney	Axeman	2 00 per day	78 00		78 00
Burt C. Hayes	Axeman	2 00 per day	18 00		18 00
Theophilus Beaupre	Axeman	2 00 per day	326 00	26 50	352 50
E. J. Fitzmartin	Axeman	2 00 per day	86 00		86 00
A. E. Williams	Axeman	2 00 per day	44 00		44 00
Chas. J. Donaher	Axeman	2 00 per day	480 00	17 94	497 94
Robert B. Curry	Axeman	2 00 per day	446 00	3 74	449 74
W. F. Lysett	Axeman	2 00 per day	384 00	4 54	388 54
E. F. Doud	Axeman	2 00 per day	406 00	14 70	420 70
Wm. H. Barhyte	Axeman	2 00 per day	396 00	10 10	406 10
Thos. J. Hassett	Axeman	2 00 per day	74 00		74 00
Frank Leyburn	Axeman	2 00 per day	92 00		92 00
Harry W. Paton	Axeman	2 00 per day	398 00		398 00
Geo. K. Shuler	Axeman	2 00 per day	574 00		574 00
Harry G. Wiard	Axeman	2 00 per day	90 00		90 00
Allyn Gilbert	Axeman	2 00 per day	334 00		334 00
Earnest Reamer	Axeman	2 00 per day	90 00		90 00
Raymond J. Curran	Tracer	75 00 per month	496 78	11 43	508 21
Raymond J. Curran	Tracer	50 00 per month	253 60		253 60
John B. Doyle	Tracer	50 00 per month	430 72		430 72
Geo. L. Knott	Tracer	50 00 per month	377 69	2 40	380 09
Percy L. Arnold	Tracer	50 00 per month	446 30	11 00	457 30
Jacob A. Erhardt	Tracer	50 00 per month	72 00	2 85	74 85
Geo. W. Zorsch	Tracer	50 00 per month	81 63		81 63
Albert E. Upson	Tracer	50 00 per month	104 00		104 00
Howard H. Burkhart	Tracer	50 00 per month	81 66		81 66
Jas. L. Sears	Tracer	50 00 per month	94 33		94 33
Chas. Montag	Tracer	50 00 per month	210 00		210 00
George F. Poinan	Inspector	4 50 per day	351 00		351 00
Robert T. Webster	Inspector	4 50 per day	454 50	12 78	467 28
L. A. McSweeney	Inspector	4 50 per day	207 00	2 90	209 90
W. H. Breen	Inspector	4 50 per day	702 00	50 58	752 58
H. F. Hughes	Inspector	4 50 per day	355 50	6 37	361 87
H. F. Hughes	Inspector	4 00 per day	104 00		104 00
Thos. McMorrow	Inspector	4 00 per day	616 00	6 28	622 28
Wm. C. Armstrong	Inspector	4 00 per day	612 00	9 49	621 49
Edward P. Boyle	Inspector	3 50 per day	52 50		52 50
John A. Harold	Inspector	3 50 per day	595 00		595 00
George F. Poinan	Inspector	3 50 per day	189 00		189 00
Glen E. Bates	Inspector	3 50 per day	399 00	136 94	535 94
Geo. W. Rogers	Inspector	3 50 per day	45 50	85	46 35
Edward M. Poinan	Inspector	3 50 per day	227 50		227 50
Edwin L. Wick	Inspector	3 50 per day	132 00		132 00
Walter G. Dubey	Rodman	4 00 per day	1,356 00		1,356 00
C. J. Bean	Rodman	4 00 per day	1,068 00	29 46	1,097 46
H. L. Clark	Rodman	3 50 per day	126 00	17 03	143 03
Morris Glassburg	Rodman	3 50 per day	28 00	13 69	41 69
Gerd. H. Schulte	Rodman	3 50 per day	28 00	8 67	36 67
M. F. Dullea	Rodman	3 50 per day	528 50		528 50
E. D. Pean	Rodman	3 50 per day	24 50		24 50
Geo. Fuller	Rodman	3 50 per day	805 00	97 41	902 41
C. L. Baldwin	Rodman	3 50 per day	595 00	11 82	606 82
E. J. Greiner	Chainman	3 00 per day	942 00	86 82	1,028 82
Wm. D. Hildreth	Chainman	3 00 per day	18 00	11 36	29 36
G. Latta Barrus	Chainman	2 50 per day	762 50	100 92	863 42
James M. Wilson	Chainman	2 50 per day	482 50	35 65	518 15
Fred. C. Facer	Chainman	2 50 per day	785 00	87 75	872 75
Dana M. Miner	Chainman	2 50 per day	585 00	91 30	676 30
Raymond C. Pugh	Chainman	2 50 per day	97 50	11 65	109 15
Theo. C. Hazard	Chainman	2 50 per day	85 00	6 06	91 06
Chas. L. Gorman	Chainman	2 50 per day	105 00		105 00
Samuel Covner	Chainman	2 50 per day	22 50	27 50	50 00

Construction of Barge Canal — Erie Canal — (Continued).

Name.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Lynn H. Barrows	Axeman	$2 00 per day	$364 00		$364 00
Leo Creighton	Axeman	2 00 per day	506 00		506 00
L. M. Waldner	Axeman	2 00 per day	394 00	$8 31	402 31
Chas. L. Gorman	Axeman	2 00 per day	40 00		40 00
Hugh F. Lynch	Axeman	2 00 per day	480 00	18 57	498 57
Geo. R. Shea	Axeman	2 00 per day	90 00		90 00
Wm. Gorman	Laborer	2 00 per day	158 00		158 00
Frank J. Madden	Laborer	2 00 per day	112 00		112 00
John Coughlan	Laborer	2 00 per day	102 00		102 00
Jno. J. Sullivan	Laborer	2 00 per day	48 00		48 00
Paul Howe	Laborer	2 00 per day	88 00		88 00
M. Cunningham	Laborer	2 00 per day	120 00		120 00
Fred'k Hempel	Laborer	2 00 per day	84 00		84 00
Chas. Watson	Laborer	2 00 per day	64 00		64 00
Henry E. Simmons	Laborer	2 00 per day	92 00		92 00
Chas. Ensign	Laborer	2 00 per day	154 00		154 00
Fred. Simpson	Laborer	2 00 per day	150 00		150 00
Chas. L. Gorman	Laborer	2 00 per day	76 00		76 00
Wm. V. Wilson	Laborer	2 00 per day	92 00		92 00
Hugh Gallagher	Laborer	2 00 per day	112 00		112 00
L. M. Waldner	Laborer	2 00 per day	104 00		104 00
Peter Arnold	Laborer	2 00 per day	182 00		182 00
Jno. Healey	Laborer	2 00 per day	120 00		120 00
Michael Gallagher	Laborer	2 00 per day	132 00		132 00
Edward Burke	Laborer	2 00 per day	102 00		102 00
B. Knight	Laborer	2 00 per day	118 00		118 00
Leo Creighton	Laborer	2 00 per day	68 00		68 00
Henry Engler	Laborer	2 00 per day	110 00		110 00
Geo. F. Polnan	Laborer	2 00 per day	26 00		26 00
Fred'k Freemesser	Laborer	2 00 per day	168 00		168 00
Edward Welch	Laborer	2 00 per day	154 00		154 00
Lynn H. Barrows	Laborer	2 00 per day	156 00		156 00
Frank Harris	Laborer	2 00 per day	24 00		24 00
Bernhardt Wende	Laborer	2 00 per day	12 00		12 00
John Mockler	Laborer	2 00 per day	36 00		36 00
Joseph Ricard	Laborer	2 00 pe	472 00		472 00
Frank J. O'Connor	Laborer	2 00 pe	104 00		104 00
Walter V. Scott	Laborer	2 00 pe	12 00		12 00
Wm. J. Berdel	Laborer	2 00 pe	80 00		80 00
Geo. H. Salisbury	Laborer	2 00 pe	678 00	35 87	713 87
Henry Van Vliet	Laborer	2 00 pe	112 00		112 00
Jerome J. Brueckel	Laborer	2 00 pe	74 00		74 00
Frank Bond	Laborer	2 00 pe	522 00		522 00
Edward W. Schlenker	Laborer	2 00 pe	116 00	22 75	138 75
Wm. McNamara	Laborer	2 00 pe	206 00		206 00
David Barrie	Laborer	2 00 pe	426 00		426 00
Chas. Pramer	Laborer	2 00 pe	10 00		10 00
Jay Westbrook	Laborer	2 00 pe	426 00		426 00
Edwin B. Male	Laborer	2 00 pe	628 00		628 00
Thos. Bushnell	Laborer	2 00 pe	628 00		628 00
Edward P. Boyle	Laborer	2 00 pe	54 00		54 00
Wm. O'Day	Laborer	2 00 pe	104 00		104 00
F. H. Carroll	Laborer	2 00 pe	54 00		54 00
Raymond Welter	Laborer	2 00 pe	612 00	42 70	654 70
Edward Moore	Laborer	2 00 pe	58 00		58 00
Jerome D. Reed	Laborer	2 00 pe	416 00		416 00
Ed. J. Burns	Laborer	2 00 pe	416 00		416 00
James Hughes	Laborer	2 00 pe	416 00		416 00
F. L. Swift	Laborer	2 00 pe	386 00		386 00
Jacob Brown	Laborer	2 00 pe	152 00		152 00
Wm. F. Guenther	Laborer	2 00 pe	158 00		158 00
P. E. Connaughton	Laborer	2 00 pe	238 00		238 00
Geo. Davis	Laborer	2 00 pe	54 00		54 00
Herbert C. Snelgrove	Laborer	2 00 pe	54 00		54 00
Francis A. O'Neil	Laborer	2 00 pe	54 00		54 00
Raymond T. Kelley	Laborer	2 00 pe	54 00		54 00
Michael Unger	Laborer	2 00 pe	628 00		628 00
Peter F. Poland	Laborer	2 00 pe	426 00		426 00
Albert F. Powers	Laborer	2 00 pe	144 00		144 00
Frederick Wood	Laborer	2 00 pe	422 00		422 00
Leo G. Barnhardt	Laborer	2 00 pe	422 00		422 00
Frank A. Hallran	Laborer	2 00 pe	44 00	32 63	76 63
Jno. A. Barrett	Laborer	2 00 pe	44 00	32 63	76 63
Fred. C. Schmitt	Laborer	2 00 pe	416 00		416 00

Construction of Barge Canal — Erie Canal — (Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Martin Woock	Laborer	$2 00 per day	$60 00	....	$60 00
James White	Laborer	2 00 per day	82 00	....	82 00
Jno. C. Hoctor	Laborer	2 00 per day	266 00	....	266 00
John Shine	Laborer	2 00 per day	120 00	....	120 00
O. W. Hard	Laborer	2 00 per day	12 00	$7 40	19 40
Frank Murtaugh	Laborer	2 00 per day	192 00	....	192 00
Chas. Blackwood	Laborer	2 00 per day	360 00	6 68	366 68
J. W. Main	Laborer	2 00 per day	....	2 12	2 12
Alexander Rogers	Laborer	2 00 per day	60 00	....	60 00
R. A. Toole	Laborer	2 00 per day	64 00	2 77	66 77
John Green	Laborer	2 00 per day	196 00	....	196 00
Frank McMahon	Laborer	2 00 per day	480 00	....	480 00
Ralph B. Smith	Laborer	2 00 per day	30 00	....	30 00
Lynn F. French	Laborer	2 00 per day	126 00	....	126 00
Thos. Shanahan	Laborer	2 00 per day	492 00	....	492 00
Thos. Clifford	Laborer	2 00 per day	642 00	....	642 00
Geo. Murphy	Laborer	2 00 per day	492 00	....	492 00
Philip Heary	Laborer	2 00 per day	300 00	....	300 00
Jacob Snell, Jr.	Gage reader	6 00 per month	78 00	....	78 00
Wm. Moran	Gage reader	5 00 per month	65 00	....	65 00
Geo. E. Krill	Gage reader	5 00 per month	10 00	....	10 00
Wm. J. Swarts	Gage reader	5 00 per month	60 00	....	60 00
John F. Wickham	Gage reader	5 00 per month	60 00	....	60 00
Carl Tuscher	Gage reader	5 00 per month	60 00	....	60 00
C. Henry Harrison	Gage reader	5 00 per month	60 00	....	60 00
Martin Hunkley	Gage reader	5 00 per month	52 50	....	52 50
					$119,234 25

Incidental Expenses.

Livery	$222 50	
Instruments, tools and appliances	1,780 74	
Office rent	1,898 22	
Fuel and light	190 19	
Stationery and printing	68 15	
Postage	151 52	
Telephone and telegraph	585 15	
Miscellaneous	10,923 82	
		15,820 29
Total		$135,054 54

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
John P. Kelly	Division engineer	$300 00 per mo.	....	$543 31	$543 31
Milton W. Wilbur	First resident engineer	225 00 per month	$2,460 00	343 57	2,803 57
F. M. Williams	Resident engineer	200 00 per month	1,800 00	133 58	1,933 58
James E. Kelley	Resident engineer	200 00 per month	2,161 29	552 39	2,713 68
D. D. Waldo	Resident engineer	200 00 per month	2,200 00	156 35	2,356 35
Geo. T. Keith	Resident engineer	200 00 per month	2,200 00	262 30	2,462 30
Chas. M. Edwards	First assistant engineer	7 00 per day	2,093 00	195 97	2,288 97
Thos. J. Morrison	First assistant engineer	7 00 per day	91 00	....	91 00
Isaac O. Cole	Assistant engineer	6 00 per day	804 00	117 00	921 00
Frank W. Bristow	Assistant engineer	6 00 per day	690 00	11 66	701 66
John H. Huber	Assistant engineer	6 00 per day	996 00	38 25	1,034 25
John Philo Kelley	Assistant engineer	6 00 per day	1,908 00	678 03	2,586 03
Geo. G. Miller	Assistant engineer	6 00 per day	1,704 00	109 84	1,813 84
Wm. C. Perkins	Assistant engineer	6 00 per day	1,908 00	366 79	2,274 79
Arthur S. Whitbeck	Assistant engineer	6 00 per day	588 00	578 29	1,166 29
John S. Clancy	Assistant engineer	6 00 per day	2,040 00	375 69	2,415 69
Wilson G. Harger	Assistant engineer	6 00 per day	1,218 00	46 54	1,264 54
Mortimer S. Smith	Assistant engineer	6 00 per day	1,776 00	112 25	1,888 25

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
J. Seward Summers	Assistant engineer	$6 00 per day	$84 00	$1 25	$85 25
G. A. Ensign	Assistant engineer	6 00 per day	18 00	10 43	28 43
Wilson G. Harger	Assistant engineer	5 00 per day	595 00	82 50	677 50
Mortimer S. Smith	Assistant engineer	5 00 per day	135 00	....	135 00
J. Seward Summers	Assistant engineer	5 00 per day	135 00	20 25	155 25
E. P. Strowger	Assistant engineer	5 00 per day	550 00	58 85	608 85
Jas. T. Schuyler	Assistant engineer	5 00 per day	760 00	213 87	973 87
Harry C. Hutchins	Assistant engineer	5 00 per day	360 00	18 78	378 78
Job R. Rogers	Assistant engineer	5 00 per day	565 00	1 35	566 35
M. W. Williams	Assistant engineer	5 00 per day	1,605 00	530 14	2,135 14
Martin A. Finch	Assistant engineer	5 00 per day	520 00	44 37	564 37
Frank T. Townsend	Assistant engineer	5 00 per day	460 00	7 49	467 49
B. L. G. Rees	Assistant engineer	5 00 per day	350 00	163 71	513 71
Smith O. Steere	Assistant engineer	5 00 per day	395 00	23 94	418 94
Hall Gleason	Assistant engineer	5 00 per day	365 00	13 92	378 92
Frank J. Kennedy	Financial clerk	5 00 per day	75 00	4 72	79 72
Peter Sheridan	Financial clerk	5 00 per day	650 00	10	650 10
A. B. Williams	Estimate clerk	4 50 per day	261 00	....	261 00
A. B. Williams	Estimate clerk	126 00 per month	441 00	....	441 00
E. P. Strowger	Leveler	5 00 per day	1,115 00	30 78	1,145 78
J. B. Barrett	Leveler	5 00 per day	660 00	....	660 00
W. T. Huber	Leveler	4 50 per day	1,417 50	507 97	1,925 47
L. R. Barnes	Leveler	4 50 per day	828 00	97 90	925 90
Job R. Rogers	Leveler	4 50 per day	220 50	....	220 50
Elmer E. Kidder	Leveler	4 50 per day	666 00	130 99	796 99
A. R. Erskine	Leveler	4 50 per day	567 00	72 03	639 03
W. G. White	Leveler	4 50 per day	229 50	21 07	250 57
L. A. McSweeney	Inspector	4 50 per day	409 50	4 86	414 36
Robert T. Webster	Inspector	4 50 per day	450 00	6 20	456 20
Thos. J. Love	Inspector	4 50 per day	1,174 50	5 94	1,180 44
C. H. Fosdick	Inspector	4 50 per day	1,498 50	45 39	1,543 89
Harry D. Waldo	Inspector	4 50 per day	324 00	19 44	343 44
George F. Poinan	Inspector	4 50 per day	297 50	3 86	301 36
Geo. W. Rogers	Inspector	3 50 per day	1,116 50	35 23	1,151 73
Grant Tibbals	Inspector	3 50 per day	780 50	22 63	803 13
Harvey G. Eckler	Inspector	3 50 per day	1,120 00	64 59	1,184 59
L. S. Webster	Inspector	3 50 per day	794 50	14 10	808 60
Chas. F. Swain	Inspector	3 50 per day	798 00	....	798 00
Chas. D. Wager	Inspector	3 50 per day	994 00	108 33	1,102 33
John A. Harold	Inspector	3 50 per day	556 50	....	556 50
R. B. Everts	Inspector	3 50 per day	518 00	29 72	547 72
Alexander Gauthier	Inspector	3 50 per day	703 50	79 61	783 11
Edward M. Poinan	Inspector	3 50 per day	259 00	....	259 00
Edwin M. Secrist	Inspector	3 50 per day	815 50	71 06	886 56
Louis Wachtel	Inspector	3 50 per day	224 00	89 68	313 68
H. B. Harrison	Inspector	3 50 per day	493 50	....	493 50
Edward P. Boyle	Inspector	3 50 per day	493 50	3 05	496 55
Geo. A. Wright	Inspector	3 50 per day	493 50	32 40	525 90
A. E. Barnes	Inspector	3 50 per day	168 00	....	168 00
C. A. Rice	Inspector	3 50 per day	238 00	8 73	246 73
J. F. Hussey	Inspector	3 50 per day	472 50	1 33	473 83
Jas. S. Douglass	Inspector	3 50 per day	458 50	....	458 50
Glen E. Bates	Inspector	3 50 per day	469 00	....	469 00
George F. Poinan	Inspector	3 50 per day	240 00	....	240 00
Horace G. McKelvey	Draftsman	5 00 per day	1,715 00	66 02	1,781 02
Tracy B. Smith	Draftsman	5 00 per day	1,205 00	25 98	1,230 98
E. A. Bonney	Draftsman	5 00 per day	1,621 00	16 82	1,637 82
B. E. Moses	Draftsman	5 00 per day	1,435 00	232 55	1,667 55
Chas. R. Zorsch	Draftsman	4 50 per day	67 50	....	67 50
Chas. A. Carruth	Draftsman	4 50 per day	720 00	15 04	735 04
B. E. Moses	Draftsman	4 00 per day	108 00	85	108 85
Martin A. Finch	Draftsman	4 00 per day	228 00	7 72	235 72
Wm. H. Dernell	Draftsman	4 00 per day	....	3 85	3 85
C. W. Brown	Draftsman	4 00 per day	348 00	....	348 00
Jas. H. Keenan	Draftsman	4 00 per day	132 00	....	132 00
J. V. Hogan	Draftsman	4 00 per day	356 00	....	356 00
W. G. White	Draftsman	4 00 per day	320 00	2 6[illegible]	322 68
Thos. S. Bailey	Draftsman	4 00 per day	368 00	....	368 00
C. E. Elmendorf	Draftsman	4 00 per day	336 00	....	336 00
Wm. J. Burns	Tracer	50 00 per month	278 33	3 45	281 78
Joseph W. Howe	Rodman	4 00 per day	1,312 00	101 36	1,413 36
C. J. Bean	Rodman	4 00 per day	200 00	5 24	205 24
Clarence M. Colony	Rodman	4 00 per day	1,276 00	113 90	1,389 90
R. W. Heerlein	Rodman	3 50 per day	514 50	18 58	533 08
A. O. Peabody	Rodman	3 50 per day	507 50	6 12	513 62

Improvement of Public Highways — (Continued).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
W. H. Ginnity	Rodman	$3 50 per day	$535 50	$7 55	$543 05
Robert C. Georger	Rodman	3 50 per day	528 50	13 33	541 83
Harold R. Holmes	Rodman	3 50 per day	304 50	....	304 50
Thurman W. Dix	Rodman	3 50 per day	276 50	5 08	281 58
Harry H. Tripp	Rodman	3 50 per day	273 00	....	273 00
Philip B. Hoge	Rodman	3 50 per day	290 50	....	290 50
Delos T. Simpson	Chainman	3 00 per day	156 00	....	156 00
Delos T. Simpson	Chainman	2 50 per day	260 00	35 34	295 34
James S. Douglass, Jr	Chainman	2 50 per day	460 00	12 74	472 74
Howard C. Young	Chainman	2 50 per day	520 00	109 45	629 45
Chas. L. Gorman	Chainman	2 50 per day	261 25	1 75	263 00
Jay F. Webster	Chainman	2 50 per day	367 50	11 23	378 73
Thos. E. McGrath	Chainman	2 50 per day	337 50	2 10	339 60
Theo. C. Hazard	Chainman	2 50 per day	280 00	....	280 00
Jas. M. Wilson	Chainman	2 50 per day	302 50	....	302 50
W. N. Langworthy	Chainman	2 50 per day	250 00	....	250 00
Geo. L. Dunlap	Chainman	2 50 per day	120 00	62	120 62
Harry B. Harrison	Axeman	2 00 per day	114 00	5 56	119 56
Philip B. Hoge	Axeman	2 00 per day	21 00	....	21 00
Arthur E. Williams	Axeman	2 00 per day	440 00	91 03	531 03
Raymond T. Dempsey	Axeman	2 00 per day	593 00	49 09	642 09
Edward M. Poirnan	Axeman	2 00 per day	301 00	10 66	311 66
Wm. J. Ward	Axeman	2 00 per day	594 00	17 49	611 49
Jno. J. Kinney	Axeman	2 00 per day	498 00	10 05	508 05
Arthur F. Bechtold	Axeman	2 00 per day	584 00	118 00	702 00
John A. Kelly	Axeman	2 00 per day	582 00	165 66	747 66
Delos T. Simpson	Axeman	2 00 per day	264 00	106 16	370 16
Robert A. Gross	Axeman	2 00 per day	518 00	52 50	570 50
Thos. J. Smith	Axeman	2 00 per day	578 00	154 49	732 49
L. F. Cashman	Axeman	2 00 per day	112 00	80 27	192 27
Geo. A. Wright	Axeman	2 00 per day	294 00	11 24	305 24
Robert B. Curry	Axeman	2 00 per day	32 00	....	32 00
Chas. L. Gorman	Axeman	2 00 per day	50 00	12 26	62 26
L. M. Waldner	Axeman	2 00 per day	180 00	....	180 00
Jno. J. Mullen	Axeman	2 00 per day	218 00	....	218 00
Sherman A. Miller	Axeman	2 00 per day	210 00	....	210 00
E. F. Doud	Axeman	2 00 per day	74 00	11 93	85 93
H. R. Breese	Axeman	2 00 per day	574 00	146 03	720 03
Dean R. Hill	Axeman	2 00 per day	126 00	....	126 00
H. W. Driher	Axeman	2 00 per day	598 00	201 70	799 70
Geo. F. Poinan	Axeman	2 00 per day	26 00	....	26 00
Fred. G. Hempel	Axeman	2 00 per day	277 00	....	277 00
Chas. Watson	Axeman	2 00 per day	470 00	52 26	522 26
Harry G. Wiard	Axeman	2 00 per day	234 00	86 11	320 11
Roy S. Barton	Axeman	2 00 per day	218 00	....	218 00
Harry J. O'Connor	Axeman	2 00 per day	214 00	9 00	223 00
Fred. Kimball	Axeman	2 00 per day	258 00	....	258 00
Louis H. Brandt	Axeman	2 00 per day	276 00	....	276 00
F. H. Carroll	Axeman	2 00 per day	258 00	....	258 00
Thos. E. Plunkett	Axeman	2 00 per day	242 00	....	242 00
Harry F. Remde	Axeman	2 00 per day	236 00	62	236 62
A. B. Roberts	Axeman	2 00 per day	52 00	40 33	92 33
Wm. E. McCarthy	Axeman	2 00 per day	274 00	....	274 00
Fred. M. Douglass	Axeman	2 00 per day	538 00	....	538 00
R. B. Everts	Axeman	2 00 per day	280 00	65 83	345 83
Finla L. Jones	Axeman	2 00 per day	528 00	46 38	574 38
E. J. Fitzmartin	Axeman	2 00 per day	494 00	92 93	586 93
Theophilus Beaupre	Axeman	2 00 per day	72 00	....	72 00
Earle J. Trimble	Axeman	2 00 per day	230 00	....	230 00
Herb't C. Snelgrove	Axeman	2 00 per day	264 00	5 30	269 30
Wm. J. Knauer	Axeman	2 00 per day	282 00	2 65	284 65
H. Archie Shafer	Axeman	2 00 per day	270 00	4 87	274 87
A. W. Balliett	Axeman	2 00 per day	134 00	....	134 00
Burt C. Hayes	Axeman	2 00 per day	264 00	....	264 00
Wm. Flattery	Axeman	2 00 per day	220 00	62	220 62
Geo. R. Shea	Axeman	2 00 per day	228 00	17 37	245 37
Raymond L. Kelly	Axeman	2 00 per day	274 00	4 10	278 10
Henry A. Ingersoll	Axeman	2 00 per day	300 00	4 38	304 38
Clarence S. Collins	Axeman	2 00 per day	312 00	....	312 00
E. M. Faller	Axeman	2 00 per day	294 00	4 10	298 10
Geo. A. Seemueller	Axeman	2 00 per day	322 00	12 24	334 24
John B. Forest	Laborer	2 00 per day	130 00	....	130 00
H. R. Breeze	Laborer	2 00 per day	62 00	....	62 00
H. W. Driber	Laborer	2 00 per day	62 00	....	62 00

Improvement of Public Highways — (Concluded).

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Walter V. Scott	Laborer	$2 00 per day	$108 00		$108 00
Francis E. Senear	Laborer	2 00 per day	110 00		110 00
Thos. F. Clifford	Laborer	2 00 per day	36 00		36 00
Geo. F. Murphy	Laborer	2 00 per day	180 00		180 00
Thos. Shanahan	Laborer	2 00 per day	186 00		186 00
Frank McMahon	Laborer	2 00 per day	186 00		186 00
John Shine	Laborer	2 00 per day	192 00		192 00
Joseph McLaughlin	Laborer	2 00 per day	188 00		188 00
Arthur F. Bechtold	Laborer	2 00 per day	54 00		54 00
H. H. Cook	Laborer	2 00 per day	54 00		54 00
Clarence S. Collins	Laborer	2 00 per day	420 00		420 00
Wm. E. McCarthy	Laborer	2 00 per day	8 00		8 00
W. D. Heffernan	Laborer	2 00 per day	66 00		66 00
E. J. Hemeister	Laborer	2 00 per day	238 00		238 00
Albert C. Burke	Laborer	2 00 per day	180 00		180 00
Frank Sheehan	Laborer	2 00 per day	40 00		40 00
John J. Bissing	Laborer	2 00 per day	54 00		54 00
John Clarey	Laborer	2 00 per day	150 00		150 00
Fred M. Pettit	Laborer	2 00 per day	68 00	$0 94	68 94
James B. Welles	Laborer	2 00 per day	54 00		54 00
Timothy Driscoll	Laborer	2 00 per day	74 00		74 00
L. F. Cashman	Laborer	2 00 per day	54 00		54 00
Wm. F. Guenther	Laborer	2 00 per day	208 00		208 00
Michael Lahey	Laborer	2 00 per day	132 00		132 00
F. A. Wannenmacher	Laborer	2 00 per day	48 00		48 00
Thos. Reilly	Laborer	2 00 per day	102 00		102 00
Edward W. Schlenker	Laborer	2 00 per day	82 00		82 00
Geo. A. Wright	Laborer	2 00 per day	54 00		54 00
Jno. C. Hoctor	Laborer	2 00 per day	222 00		222 00
Daniel C. McCarthy	Laborer	2 00 per day	230 00	1 70	231 70
Delos T. Simpson	Laborer	2 00 per day	54 00		54 00
Frank Murtaugh	Laborer	2 00 per day	426 00		426 00
Ralph Smith	Laborer	2 00 per day	128 00		128 00
Martin Woock	Laborer	2 00 per day	290 00		290 00
Jacob Brown	Laborer	2 00 per day	212 00		212 00
Thos. H. Clark	Laborer	2 00 per day	54 00		54 00
Jno. A. Kelly	Laborer	2 00 per day	54 00		54 00
James White	Laborer	2 00 per day	72 00		72 00
Thos. M. Nolan	Laborer	2 00 per day	82 00		82 00
Edward F. La Due	Laborer	2 00 per day	84 00		84 00
O. W. Hard	Laborer	2 00 per day	624 00		624 00
A. B. Roberts	Laborer	2 00 per day	54 00		54 00
M. J. McCarthy	Laborer	2 00 per day	82 00		82 00
E. J. Fitzmartin	Laborer	2 00 per day	54 00		54 00
R. A. Toole	Laborer	2 00 per day	530 00		530 00
Raymond Kelly	Laborer	2 00 per day	186 00		186 00
Harry Jordan	Laborer	2 00 per day	66 00		66 00
Thos. Smith	Laborer	2 00 per day	54 00		54 00
Harry B. Harrison	Laborer	2 00 per day	54 00		54 00
Raymond J. Curran	Laborer	2 00 per day	38 00		38 00
Edward M. Poinan	Laborer	2 00 per day	10 00		10 00
Finis L. Jones	Laborer	2 00 per day	54 00		54 00
Fred. M. Douglass	Laborer	2 00 per day	54 00		54 00
R. B. Everts	Laborer	2 00 per day	52 00		52 00
Henry Engler	Laborer	2 00 per day	120 00		120 00
Geo. F. Poinan	Laborer	2 00 per day	28 00		28 00
Raymond T. Dempsey	Laborer	2 00 per day	54 00		54 00
Frederick Freemesser	Laborer	2 00 per day	54 00		54 00
Wm. J. Ward	Laborer	2 00 per day	64 00		64 00
P. E. Connaughton	Laborer	2 00 per day	28 00		28 00
					$109,079 94

Incidental Expenses.

Stationery and printing	$104 21	
Livery	6,917 78	
Fuel and light	97 75	
Postage	324 12	
Office rent	1,639 50	
Telephone and telegraph	1,392 08	
Miscellaneous	6,596 76	
		17,072 20
Total		$126,152 14

Maintenance and Repairs of Improved Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

Road No.	NAME OF ROAD.	Town.	County.	Amount.
2...	Buffalo-Hamburg (Whites Corners)	West Seneca and Hamburg	Erie	$5,081 44
5...	East avenue	Brighton and Pittsford	Monroe	2,224 91
6...	Ridge, section 1	Greece	Monroe	6,973 64
13...	Southport, section 1	Southport	Chemung	5,576 29
28...	Southport, section 2	Southport	Chemung	1,712 15
29...	Southport, section 3	Southport	Chemung	635 87
30...	South Broadway	Southport	Chemung	625 12
60...	Fairport	Pittsford and Perinton	Monroe	246 50
62...	West Henrietta	Brighton and Henrietta	Monroe	35 30
63...	Scottsville, section 1	Chili	Monroe	256 35
67...	Orchard Park, section 3	East Hamburg and West Seneca	Erie	40
69...	Main street, section 1	Amherst	Erie	7,488 52
78...	Clifton, section 1	Chili	Monroe	1,650 59
79...	Scottsville, section 2	Chili	Monroe	324 01
80...	Hamlin, section 1	Clarkson	Monroe	1,335 70
81...	Hamlin, section 2	Hamlin	Monroe	60 69
83...	Buffalo, section 2	Gates	Monroe	252 81
86...	Big Tree	Aurora and Wales	Erie	7,442 54
87...	Main street, section 2	Amherst	Erie	978 30
88...	Transit, section 1	Amherst and Clarence	Erie	2,771 79
89...	Transit, section 2	Amherst and Clarence	Erie	3,097 93
94...	Monroe avenue	Brighton and Pittsford	Monroe	1,318 30
98...	Webster, section 1	Irondequoit	Monroe	2,632 30
99...	Webster, section 2	Penfield and Webster	Monroe	3,981 44
100...	Webster, section 3	Webster	Monroe	1,650 12
128...	Aurora-Buffalo	West Seneca	Erie	18,298 52
130...	Main street, section 3	Clarence	Erie	1,615 54
131...	Main street, section 4	Clarence and Newstead	Erie	988 71
146...	Geneva-Canandaigua, section 1	Seneca	Ontario	44 38
165...	Little Ridge, section 2	Parma	Monroe	5 00
168...	Dugway, section 1	Brighton and Penfield	Monroe	212 27
169...	Dugway, section 2	Penfield	Monroe	1,700 23
171...	Lake	Sweeden	Monroe	455 44
172...	Portland avenue, section 1	Irondequoit	Monroe	56 90
187...	Bristol	Canandaigua	Ontario	1,034 12
188...	Bristol Valley	E. Bloomfield and Bristol	Ontario	1,210 20
207...	Geneva-Canandaigua, section 2	Hopewell and Canandaigua	Ontario	253 28
251...	Griswold street	Royalton	Niagara	23 62
257...	Little Ridge, section 4	Clarkson	Monroe	184 40
356...	Erin-Horseheads	Horseheads and Erin	Chemung	358 95
357...	Grand Central avenue, section 1	Elmira and Horseheads	Chemung	332 47
386...	Five Corners-Kuckville, section 1	Gaines	Orleans	287 90
479...	Fairport, section 2	Perinton	Monroe	94 49
482...	Dansville-Mt. Morris	Mt. Morris	Livingston	471 57
	Total			$86,011 00

Survey for State Court of Claims.

Chapter 686, Laws of 1906.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
M. W. Wilbur	First resident engineer	$225 per month	$15 00	$20 39	$35 39
D. D. Waldo	Resident engineer	200 per month		5 88	5 88
Chas. W. Edwards	First assistant engineer	7 00 per day	62 11	90	63 01
Frank W. Bristow	Assistant engineer	6 00 per day	60 00	21 39	81 39
Tracy B. Smith	Draftsman	5 00 per day	285 00	53 97	338 97
Harry J. Simmelink	Rodman	3 50 per day	94 50		94 50
					$619 14
Incidental Expenses.					
Livery				$23 00	
Miscellaneous				6 42	
					29 42
Total					$648 56

Survey for Keuka Lake Outlet Lighthouse.

Chapter 266, Laws of 1908.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
John P. Kelly	Division engineer	....	....	$5 00	$5 09
James E. Kelley	Resident engineer	$200 per month	$25 80	33 71	59 51
Chas. M. Edwards	First assistant engineer	7 00 per day	....	5 40	5 40
E. P. Strowger	Leveler	5 00 per day	20 00	....	20 00
H. G. McKelvey	Draftsman	....	....	6 37	6 37
E. A. Bonney	Draftsman	5 00 per day	22 50	....	22 50
Harvey G. Eckler	Laborer	2 00 per day	10 00	....	10 00
Albert Murphy	Laborer	2 00 per day	8 00	....	8 00
					$136 87
Incidental Expenses.					
Livery				$3 00	
Telephone and telegraph				65	
Miscellaneous				12 40	
					16 05
Total					$152 92

Survey for Lyell Avenue Bridge, Rochester.

Chapter 287, Laws of 1908.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
Chas. M. Edwards	First assistant engineer	$7 00 per day	$21 00	$20 00	$21 20
A. G. Hayden	Designer	160 per month	273 20	....	273 20
C. E. Elmendorf	Draftsman	4 00 per day	16 00	....	16 00
Harold R. Holmes	Rodman	3 50 per day	17 50	....	17 50
Fred. Kimball	Axeman	2 00 per day	6 00	....	6 00
John B. Forest	Laborer	2 00 per day	6 00	....	6 00
					$339 90
Incidental Expenses.					
Miscellaneous					1 10
Total					$341 00

Survey for Allen Street Bridge, Rochester.

Chapter 291, Laws of 1908.

NAME.	Rank.	Rate of compensation.	Services.	Travel.	Total.
[illegible]	First assistant engineer	$7 00 per day	$28 00	$0 10	$28 10
[illegible]	Designer	175 per month	211 51	....	211 51
[illegible]	Designer	110 per month	22 00	....	22 00
[illegible]	Draftsman	110 per month	278 67	....	278 67
[illegible]	Draftsman	75 per month	22 50	....	22 50
[illegible]	Draftsman	4 00 per day	16 00	....	16 00
[illegible]	Rodman	3 50 per day	14 00	....	14 00
[illegible]	Axeman	2 00 per day	6 00	....	6 00
[illegible]	Laborer	2 00 per day	6 00	....	6 00
					$604 78
Incidental Expenses.					
Miscellaneous					1 05
Total					$605 83

SUMMARY.

The foregoing tables are summarized as follows:

Ordinary Repairs to Canals.

1. Erie canal, chapter 577, Laws of 1907	$8,501 61

Construction of Barge Canal.

2. Construction of Barge canal, chapter 147, Laws of 1903, and amendatory laws	135,054 54

Improvement of Public Highways.

3. Improvement of public highways, chapter 115, Laws of 1898, and amendatory laws	126,152 14
4. Maintenance and repairs of improved public highways, chapter 115, Laws of 1898, and amendatory laws	86,011 00

Special Surveys.

5. Survey for State Court of Claims, chapter 686, Laws of 1906	648 56
6. Survey for Keuka lake outlet lighthouse, chapter 266, Laws of 1908	152 92
7. Survey for Lyell avenue bridge, Rochester, chapter 287, Laws of 1908	341 00
8. Survey for Allen street bridge, Rochester, chapter 291, Laws of 1908	605 83
Total	$357,467 60

TABLE OF CONTRACTS COMPLETED ON THE WESTERN DIVISION DIVISION DURING THE FISCAL YEAR ENDED SEPTEMBER 30, 1908.

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

CONTRACTOR.	Date of contract	Character of work.	Contract price.	Final payment.
Frederick A. Brotsch	July 11, 1906	I well road No 253 Monroe county	$18,000 00	$20,285 75
Greece Construction Co	July 13, 1906	[illegible]	23,600 00	25,880 78
Gantz-Wilson Construction Co	July 18, 1906	[illegible]	39,950 00	39,486 95
...ervisors	July 10, 1906	[illegible]	6,500 00	6,532 51
[illegible]	July 11, 1906	[illegible]	26,000 00	26,970 78
[illegible]	July 7, 1906	[illegible]	93,012 00	93,807 99
[illegible]	Aug 31, 1906	...ounty.	17,531 00	20,159 91
[illegible]	July 9, 1906	[illegible]	22,700 00	23,328 73
[illegible]	Sept 24, 1907	[illegible]	6,684 78	7,849 10
...inus	Dec 3, 1907	[illegible]	27,170 88	28,521 19
[illegible]	Nov 26, 1907	[illegible]	23,790 30	24,666 50
...n Co	Sept 8, 1906	[illegible]	23,500 00	28,848 45
[illegible]	Nov 26, 1907	[illegible]	3,376 25	3,427 23
Baldwin Contracting Co	July 9, 1906	[illegible]	38 699 00	39,981 73
Frederick W. Knickenberg	June 30, 1906	[illegible]	37,900 00	42,559 15

TABLE OF CONTRACTS PENDING ON THE WESTERN DIVISION, SEPTEMBER 30, 1908.

Construction of Barge Canal.

Chapter 147, Laws of 1903, and amendatory laws.

CONTRACTOR.	Date of contract	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1908.
F. A. Maselli & Co.	May 3, 1905	Contract No. 6, Erie canal — Buffalo road, southwest of Rochester, to near South Greece	$1,381,662 50	$1,024,256 80	$594,324 00
Groton Bridge Co	Aug. 10, 1906	*Contract No. 7, Erie canal — Bridges on Contract No. 6	28,662 80	27,302 45	5,418 00
Thomas Crimmins Contracting Co.	Mar. 18, 1908	Contract No. 9, Erie canal — Eagle Harbor to Beal's bridge	724,014 00	755,995 00	56,331 00
Great Lakes Construction Co.	Nov. 26, 1906	Contract No. 19, Erie canal — Sulphur Springs guard-lock to	1,038,245 00	892,991 16	117,315 00
Empire Engineering Corporation	Aug. 6, 1908	Contract ... South Greece to near Adams	1,267,301 00	1,349,084 00	5,922 00
Empire Engineering Corporation.	Aug. 6, 1908	Contract ... ear Prospect street bridge, ... bridge	1,207,930 00	1,290,492 00	......
Empire Engineering Corporation.	Sept. 22, 1908	Contract ... ar Gasport bridge to near loc	751,039 00	750,685 50	......

* Contract No. 7 includes work on Eastern, Middle and Western divisions.

Improvement of Public Highways.

Chapter 115, Laws of 1898, and amendatory laws.

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1908.
Frederick A. Brotsch	July 11, 1906	Chili (section 1) road, No. 254, Monroe county	$27,700 00	$19,400 00	$23,445 05
Frederick A. Brotsch	July 11, 1906	Chili (section 2) road, No. 255, Monroe county	26,000 00	16,070 00	12,441 52
Stewart-Kerbaugh-Shanley Co.	Sept. 20, 1907	... Church-Redman road, No. 286,	40,300 00	36,392 40	19,118 65
Monroe Roads Company	Sept. 17, 1907	... 1) road, No. 294, Monroe county.	44,900 00	40,475 34	33,770 43
Bennett & Ryan	Mar. 9, 1908	... 355, Chemung county.	55,000 00	54,176 55	29,572 51

......	Dec. 2,			
Co...	July 18,	80,600 00	77,954 40	56,645 75
Co....	July 18,	55,900 00	45,925 00	137,959 65
....	July 9,	61,500 00	52,995 00	81,568 81
.....	Aug. 31,	84,400 00	69,197 00	57,552 64
.....	Sept 27,	41,500 00	36,935 00	29,459 79
......	Sept 27,	21,600 00	17,974 10	9,073 80
.....	Dec. 4,	19,000 00	16,636 25	7,503 30
Co ..	Dec. 18,	31,600 00	25,136 00	18,767 25
...	Sept 19,	37,500 00	30,342 10	....
......	Dec. 4,	82,000 00	72,004 95	61,100 46
.....	Nov. 26,	32,300 00	24,805 65	24,092 56
......	Nov. 26,	20,100 00	17,412 60	4,161 41
.. ...	Jan. 20,	17,200 00	14,695 55	12,621 42
. ....	July 9,	32,900 00	30,000 00	25,483 50
. ...	Sept. 17,	114,900 00	94,000 00	72,635 04
Co ..	Sept. 20,	73,900 00	64,585 65	54,343 19
Co...	Sept. 20,	46,900 00	44,446 80	27,734 00
Stewart-Kerbaugh-Shanley Co...	Sept. 20,	37,300 00	36,454 25	....
Stewart-Kerbaugh-Shanley Co...	Sept. 20,	87,500 00	72,915 00	....
Stewart-Kerbaugh-Shanley Co ...	Sept. 20,	66,500 00	61,257 75	12,031 65
Stewart-Kerbaugh-Shanley Co .	Sept. 20,	49,000 00	45,596 90	26,752 27
Stewart-Kerbaugh-Shanley Co	Dec. 18,	14,000 00	13,077 55	10,835 60
Stewart-Kerbaugh-Shanley Co	Dec. 18,	19,800 00	18,194 65	9,344 88
Henry P. Burgard Co	May 7,	11,400 00	10,425 35	8,545 50
Gantz-Wilson Construction Co .	Sept. 24,	87,700 00	76,010 70	54,887 30
Gantz-Wilson Construction Co . .	Dec. 18,	39,000 00	35,963 20	8,616 22
Gantz-Wilson Construction Co .	Dec. 18,	26,600 00	26,503 25	13,249 80
Co....	Sept 20,	12,700 00	14,977 08	11,648 83
Co .	Sept. 20,	35,000 00	32,330 35	23,627 48
Co ..	Dec. 18,	49,200 00	46,197 30	....
Co ...	Dec. 18,	60,500 00	56,514 65	21,389 68
Stewart-Kerbaugh-Shanley Co....	Dec. 18,	43,200 00	39,839 40	24,929 87
Stewart-Kerbaugh-Shanley Co....	Feb. 11,	72,400 00	65,268 95	13,594 05
		12,600 00	11,794 00	7,756 66

TABLE OF CONTRACTS PENDING ON THE WESTERN DIVISION, SEPTEMBER 30, 1908 — (Concluded).

Improvement of Public Highways — (Concluded).

CONTRACTOR.	Date of contract.	Character of work.	Engineer's preliminary estimate.	Contract price.	Payments to September 30, 1908.
Stewart-Kerbaugh-Shanley Co.	Feb. 11, 1908	Otto-East Otto (section 1) road, No. 696, Cattaraugus county	$41,500 00	$33,901 60	$1,557 40
Stewart-Kerbaugh-Shanley Co.	Feb. 11, 1908	Otto-East Otto (section 2) road, No. 697, Cattaraugus county	20,500 00	17,362 90	10,419 52
E. M. Love and Son	Feb. 5, 1908	Falconer-Kennedy road, No. 698, Chautauqua county	11,500 00	9,845 70	4,683 01
Star Contracting Co.	Jan. 30, 1908	Portville-Olean (section 1) road, No. 730, Cattaraugus county	39,900 00	35,104 15	....
Star Contracting Co.	Jan. 30, 1908	Portville-Olean (section 2) road, No. 731, Cattaraugus county	25,800 00	19,619 50	5,469 90
Bradley & Nolan	Jan. 30, 1908	Big Flats-Gibson road, No. 742, Steuben county	53,200 00	48,185 43	42,440 03

Report of Tests

Report of the Land Bureau

Report of Tests.

TESTING LABORATORY — STATE HALL.

ALBANY, N. Y., *October* 1, 1908.

Hon. FREDERICK SKENE, *State Engineer and Surveyor:*

SIR.— I have the honor to submit the following report of the work of the testing laboratory of your Department for the fiscal year ended September 30, 1908.

The work of the year has been more than simply routine, for, besides the regular testing of cement, the scope of the laboratory has been extended and tests are now being made of sand, as well as cements, and the testing of stone for road use has become well established. Many special tests of considerable variety have made the work of particular interest and value. Inspection of cement at the cement mills before shipment to the work is made, has become one of the duties of the laboratory force.

CEMENT TESTS.

The routine work of testing cement has been largely increased during the past year because of the greater amount of work being done upon the Barge canal and upon the public highways. The work done also includes a large number of tests made for the works under the direction of the State Architect. Although the laboratory for making these tests was enlarged about three years ago, it was found necessary again to increase the capacity of the laboratory in order to be able to do the work of the Department. This increase in apparatus was made and the laboratory is now able quickly to take care of all its work.

During the past year there have been submitted to this laboratory for tests 1,188 lots of cement samples, consisting of a total of 17,142 samples. The number of lots tested shows an increase of 53.5 per cent over the number tested the previous year, while the number of samples shows an increase of 59.8 per cent for the same period. In this year nearly three times as many cement samples were tested as during the year ended September 30, 1906.

Of the total number of samples tested, 9,397, or 54.8 per cent, were for Barge canal; 4,958, or 28.6 per cent, were for public highways; and 2,887, or 16.6 per cent, were for the State Architect. The samples represented a total of 393,734 barrels of cement.

Each sample submitted, mixed in the proportion of one part of cement to three parts of standard quartz sand, was tested for tensile strength at the ends of seven and twenty-eight days. In addition to the tests for tensile strength, each lot of samples was given tests for fineness of grinding, for initial and hard sets, and for soundness by means of the steam test, the normal-water tests and the normal-air test. Frequently the cements are completely analyzed and are especially checked for sulphuric anhydride ($S\,O_3$) and magnesia ($Mg\,O$).

Of the cement tested practically all was Portland cement, as only a very small amount of natural cement was used. The brands represented by the samples received are about the same as heretofore and consist of 23 American Portland and one natural. Of the Portland brands, 8 were manufactured in New York, 12 in Pennsylvania and 3 in New Jersey.

A brief description of the method used in making the tests in this laboratory will probably make the results of the tests much better understood as well as more easily comparable with the results obtained in other testing laboratories. The method is practically the same as that recommended by the American Society of Civil Engineers. It is as follows:

Sampling.— After the cement proposed to be used upon any contract work of the State has been delivered and well stored, the engineer in charge, or his representative, takes one sample from every tenth barrel of cement or from the equivalent of the tenth barrel when packed in sacks. Each sample is placed in a double envelope-bag upon which is printed such matter as when filled in by the person taking the sample will give the sample number, brand of cement, date of sampling and work upon which the cement is to be used. About twenty ounces of cement are taken for each sample. The samples are packed firmly and dry in wooden boxes and are then sent by express to this laboratory. Upon receipt here a portion of every sample is taken and these portions are thoroughly

mixed into a large general sample. From this mixed sample is taken the cement used in making the tests of fineness, setting qualities, soundness, specific gravity and analysis.

Fineness.— The tests for fineness consist of drying the sample and then weighing on a scale capable of weighing to one ten-thousandth part of a pound a certain amount of the cement. This is carefully sieved through standard sieves of 2,500 and 10,000 meshes to the square inch. The sieving is done by means of a mechanical sifter operated by electricity, but all tests are completed by hand sifting. The residue is weighed and the percentages thus obtained. Ninety-nine per cent of the cement must pass the 2,500-mesh sieve and 92 per cent must pass the 10,000-mesh sieve.

Setting qualities.— From the mixed sample enough is also taken to make a ball of paste for the mould of the Vicat apparatus and for 3 neat pats. This is mixed up into a paste of normal consistency by adding from 18 to 25 per cent, by weight, of water to Portland cements and from 28 to 33 per cent to natural cements. After being thoroughly troweled this paste is moulded into a ball and pressed into the inverted mould and the paste struck off even with the bottom of the mould. It is then turned over and the top struck off even. This is then placed in the moist-air cabinet and tested from time to time by the Vicat needle. To be accepted, Portland cements must not take an initial set in less than 30 minutes or natural cements in less than 20 minutes; Portland cements must not take a hard set in less than an hour or require more than 10 hours to get hard set; natural cements must not take a hard set in less than 30 minutes or require more than 3 hours. The time is estimated from the moment of adding the water to the cement.

Soundness.— That cement paste which is left from the above test is moulded into 3 pats on glass plates about 3 inches by 4 inches in size. These pats are about one-half inch thick in the center and are drawn out to thin edges. As soon as made, the neat pats are placed in a moist-air cabinet and allowed to take their set. When the pats have hardened for 24 hours one is put in the steam of water at 212 degrees Fahr. for 5 hours. This is the "accelerated" or "hot-water" test; and if the pat, after being in the steam for 5 hours, shows no sign of blowing or cracking, it is

reported as "good," The other pats are given normal-air and water tests by being kept respectively in air and water maintained at from 60 to 70 degrees Fahr.

Tensile strength — Mortar.— For the tests for tensile strength, each sample is gaged separately with its proper proportion of standard crushed quartz sand, 1 part of cement to 3 parts of sand, parts by weight. As each sample is thus gaged it is put into a small pan and each is kept in the order of its number, so that the samples will not lose their identity. Each separate sample of cement and sand is thoroughly mixed dry and then from 9 to 11 per cent by weight of water is added to Portland cements and from 10 to 13½ per cent by weight to natural cements. The percentage used is such as will give a stiff mortar, which will show up water when the trowel is drawn heavily over it. This mortar is thoroughly troweled and is then put into the moulds.

Briquettes.— The mould, which is of brass and of the standard form recommended by the American Society of Civil Engineers, is first filled with loose mortar and this is carefully compacted by pressing down with the thumbs protected by rubber gloves. More loose mortar is placed in the mould and is pressed down as before. This makes about three-quarters inch of mortar in the mould, having been placed in about three-eighths-inch layers. The top layer is placed by striking a further addition of loose mortar with the back of the trowel. The briquette is then struck off even with the top of the mould. Two briquettes are made from each sample.

Treatment.— As soon as made, the briquettes are placed upon plates of glass and are placed in the moist-air cabinet, care being taken to keep them in their order so as to still retain their identity. After the mortar has hardened, the briquettes are removed from the moulds and replaced in cabinet. Twenty-four hours after gaging they are marked with a number which is given to each briquette consecutively as each is made, and are immersed and kept in water maintained at a temperature of about 60 to 70 degrees Fahr.

Breaking.— On the seventh day after gaging, the first test for tensile strength is given, and 21 days later, or on the 28th day after gaging, the second briquette of each sample is broken for tensile

strength. Three improved Fairbanks cement testing machines are used to obtain these results. All the operations are so conducted that there is perfect uniformity in the treatment of all the samples.

Strength.— Portland cements, mixed as described, must show an average of at least 150 pounds per square inch in tensile strength in 7 days and an average of at least 240 pounds per square inch in 28 days. Natural cements, mixed as described, must show a tensile strength of an average of at least 40 pounds per square inch in 7 days and an average of at least 100 pounds per square inch in 28 days.

Neat briquettes.— Tests for tensile strength of neat briquettes are seldom made, as the practice of this Department is to place the greater dependence upon the mortar tests. Whenever they are made, however, they are made and treated in a manner similar to that given mortar briquettes, excepting, of course, that a greater percentage of water is used — usually being about 1 per cent less than that used in gaging for the neat pats of that particular lot or brand. Neat briquettes of Portland cement, so made, must show an average of at least 500 pounds per square inch in tensile strength in 7 days; and neat briquettes of natural cement, similarly made, must show an average of at least 150 pounds per square inch in tensile strength in 7 days.

Analysis.— The method of analysis used in examination of cements is that recommended by the committee of the New York Section — Society for Chemical Industry.

Specific gravity.— The tests for specific gravity are made as suggested by the American Society of Civil Engineers — the Le Chatelier apparatus being used as recommended.

Acceptance.— At the end of the 7-day tests, all results obtained on tests of samples of cement proposed for use on all works except the Barge canal are submitted to Mr. Grank L. Getman, Deputy State Engineer, while results for cement proposed for use of Barge canal are submitted to Mr. William R. Hill, Special Deputy State Engineer, and if thought best, are held for the 28-day tests, the lots being accepted or rejected by them according as the results show that the cement passes or fails in the tests.

Our method of testing each sample separately for tensile strength has proven very satisfactory; in fact, by means of it, much

poor cement has been discovered which would have stood the tests had all of the samples of the lot been blended. This method, however, makes necessary a larger equipment and a more complete system of operation than is necessary under the general method of testing a blended sample. Although the laboratory was enlarged during the past year, a further enlargement will probably be needed within another year. The effort, however, is made to maintain as complete a laboratory with as little expense as possible; but it is hoped that the laboratory and its results will be so complete as to be placed by experts as being among the best in the country.

The specifications for cement follow closely those recommended by the American Society for Testing Materials and vary from them only in some minor details.

Mill inspection.— In addition to the regular method of sampling, as already described in this report, it has been found advisable to sample cement proposed for use on the Barge canal, at the various mills. When there is enough cement to warrant doing so, an inspector is sent to a cement mill to sample cement and inspect shipments. The method of carrying on this work is as follows:

The inspector takes samples from the various parts of the bin; each sample is shipped to the Testing Laboratory at Albany by the same method as described and also is tested in the same way. The endeavor is to obtain from the sampling and the testing of these samples the "run of the product." As soon as the samples are taken the inspector places the bin of cement under the seal of this Department and the bin is so sealed that no cement can be added to or taken from the bin without the breaking of the seal.

When the results of the tests have been secured, the reports are made in the usual way, and then, if the cement is accepted, the bin of cement is assigned to the contract which may have placed an order for the cement. When the contractor needs cement, the inspector at the mill breaks the seal on the bin, inspects the loading of the car or cars, seals these with the Department seal and then reseals the bin of cement. A notice of shipment is forwarded to the laboratory and to the resident engineer in charge of the contract to which the cement has been assigned. When the car or cars arrive on the work the seal of the Department must be broken

by the resident engineer, or his representative, otherwise the lot of cement must be sampled and tested in the usual way.

This work of inspection has added considerably to the work of the Testing Laboratory as an average of five inspectors are continually at this work and it is all done through the laboratory.

SAND TESTS.

The importance of thorough examination and tests of the sands proposed for use on the Barge canal has been practically demonstrated. Eighty samples of sand have been tested along the lines of tests established during the previous year. These tests are as follows: The sands are examined under the microscope for those elements that give the sand its characteristics. The other tests are for voids, loam, fineness, or grading, and tensile strength with cement. The latter are made from the sand in its natural condition and washed; and the cement used is a "Standard" cement made by mixing together in the laboratory several brands of cement which run nearly alike in the regular tests. All tests for tensile strength cover at least 28 days, but many long-time tests are being carried.

The "testing of sand" also includes the testing and examination of substitutes for sand, such as screenings and iron ore tailings. Several extended tests of these latter materials have been made.

STONE TESTS.

A laboratory for the testing of stone proposed for use on the improvement of the public highways had been fitted at the beginning of the fiscal year and the work of testing was soon well begun. Because of the lack of room in which to expand and also with the intention of eliminating as much noise as possible from the rest of the laboratory, a vault room had been built by the Department adjacent to the rooms in the State Hall now being used for the testing of cement. In this, apparatus specially designed for the testing of road metal had been placed. These pieces of apparatus were modeled after those in the laboratory of the Office of Public Roads, U. S. Department of Agriculture, Washington, D. C., and consist of the following: A four-cylinder Deval abrasion ma-

chine, a hardness machine, a diamond core drill, a lapidary and diamond saw, two ball-mills, a small stone crusher, a Page hydraulic briquette moulding machine, and an impact machine for testing toughness and another for securing cementing value — these latter were modeled after the new machine developed by Mr. Logan W. Page, Director, Office of Public Roads, and which are now being used in their laboratory. The motive power is furnished by a 3-h.p. motor. With this apparatus, it will be possible to test four samples per day — the capacity of the laboratory at Washington. Other states have secured some of this apparatus, but this Department is the first one to duplicate the National laboratory.

The tests and the methods of making the tests follow those established by the Office of Public Roads, U. S. Department of Agriculture. The tests are as follows: Per cent of wear, French coefficient of wear, hardness, toughness, cementing value, specific gravity, weight per cubic foot, and absorption. While the work of testing road materials is comparatively of recent developement, it has reached the stage where most excellent economic results are obtained. Up to the present date, 362 samples of stone have been given complete tests. Of these, 137 samples were accepted for both courses of the various roads and 90 were accepted for the bottom course only; 52 samples were rejected for the top course and 6 were rejected for both courses. Samples of stone from 46 commercial quarries were tested and the results obtained were used in determining their value for use under the specifications.

Many miscellaneous tests have been conducted in the laboratory, — such as examination of the laitance formed in concrete, the effect of clay in sand, the fine dust in screenings and foreign material found in stone proposed for use in concrete. Laboratory examinations have been aided by inspection on the work, where questions concerning these have arisen. In conclusion it should be stated that not only has the work greatly increased, but the field of work has also increased.

Respectfully submitted,

RUSSELL S. GREENMAN,

Resident Engineer in charge of Tests.

Report of the Land Bureau of the State Engineer's Department.

ALBANY, *October* 1, 1908.

Hon. FREDERICK SKENE, *State Engineer and Surveyor:*

SIR.— I have the honor to present herewith a report on the various matters pertaining to the Land Bureau of your Department for the fiscal year ended September 30, 1908.

The Commissioners of the Land Office have applications for grants of land under water which are referred to this Department for examination and report; as are also a large number of miscellaneous matters relating to State lands. These matters require careful inspection and naturally consume a great deal of time.

The maps and papers are examined to determine their correctness and proper form, both from an engineering standpoint and to insure their conformity to the rules and regulations of the Land Office.

In some cases it is also necessary to visit and inspect the locations of the proposed grants to decide as to the advisability of making the grants on the lines of the application, or, if necessary, to have them modified.

It is also at times deemed advisable to deny some of these applications on account of interference with navigation or with the rights of the public.

Some applications were contested or had remonstrances filed against them, and hearings have been necessary to determine the rights of the several interested parties and report the outcome to the Commissioners of the Land Office.

There have been made in this Department, for the use of the State Engineer and Surveyor and the Commissioners of the Land Office, maps showing the lands under water granted by the Commissioners, adjacent to the shores of Albany, Columbia, Dutchess, Erie, Greene, Kings, Nassau, Niagara, Orange, Queens, Rensselaer, Richmond, Rockland, Suffolk, Ulster and Westchester counties.

These maps are brought up to date and are of great value for reference in adjusting land grants.

Construction of Barge Canal — I

NAME.	Rank.
Jno. J. Sullivan	Axeman
L. R. Bickford	Axeman
Philip D. Ungerer	Axeman
Frank N. Sisson	Axeman
Geo. E. Merry	Axeman
Wm. H. Kingston	Axeman
Herman A. Schroedel	Axeman
Paul Howe	Axeman
H. C. Snelgrove	Axeman
Frank J. O'Neil	Axeman
Geo. Davis	Axeman
Geo. F. Polnan	Axeman
Edward P. Boyle	Axeman
John J. Kinney	Axeman
Burt C. Hayes	Axeman
Theophilus Beaupre	Axeman
E. J. Fitsmartin	Axeman
A. E. Williams	Axeman
Chas. J. Donaher	Axeman
Robert B. Curry	Axeman
W. F. Lysett	Axeman
E. F. Doud	Axeman
Wm. H. Harbyte	Axeman
Thos. J. Hassett	Axeman
Frank Leyburn	Axem
Harry W. Paton	Axen
Geo. K. Shuler	Axen
Harry G. Wiard	Axer
Allyn Gilbert	Ax
Earnest Reamer	Ax
Raymond J. Curran	Tr
Raymond J. Curran	Tr
John B. Doyle	
Geo. L. Knott	
Percy L. Arnold	
Jacob A. Erhardt	
Geo. W. Zorsch	
Albert E. Upson	
Howard H. Burkhart	
Jas. L. Sears	
Chas. Montag	
George F. Polnan	
Robert T. Webster	
L. A. McSweeney	

REPORT

OF

ion of United States
ological Survey

WITH

ENGINEER AND SURVEYOR

OF THE

STATE OF NEW YORK

1908

Twenty-two applications for grants of land under water were considered by this Department during the year; all for restricted beneficial enjoyment. The lands were in the following counties: Columbia, Dutchess, Erie, Nassau, Orange, Otsego, Queens, Richmond, Rockland, Suffolk and Westchester.

The State Engineer and Surveyor has sold at public auction all of those unappropriated lands of the State which have been ordered to be sold by the Commissioners of the Land Office.

The records of the office show that there were held during the year twenty-three public auctions, at which thirty-seven parcels of land were sold. The sum of $10,247 was realized therefrom.

Of these lands twenty-seven parcels were acquired through the Comptroller's tax sales, seven from foreclosure of loan mortgages, and three from escheat or unappropriated lands. The lands are located in the following counties: Albany, Cattaraugus, Chenango, Erie, Kings, Livingston, New York, Niagara, Onondaga, Queens, Rensselaer, Richmond, Rockland, St. Lawrence, Ulster, Westchester and Yates.

There has been the usual amount of correspondence and answering of inquiries from surveyors, lawyers, and others on matters pertaining to the original maps and descriptions of the Colonial and early State surveys filed in this office. The answering of such inquiries often requires much time and study, as there are frequently more than one survey of the same land made at different times by various surveyors, and none should be overlooked. These maps become more valuable as time passes; and as a large part of them are very old and describe lines of tracts of land which have become, in many instances, the boundaries of towns and counties, the value of those records becomes still greater.

For better preserving these records they have been rearranged, placed in bound volumes and indexed for convenience of reference. That it is the proper method for the care of these valuable papers, and that it affords greater facility for finding particular papers with the certainty that none have been overlooked, has already been fully demonstrated.

Respectfully,

MERRITT PECKHAM, JR.,
Assistant Engineer in charge of Land Bureau.

REPORT

OF

Coöperation of United States Geological Survey

WITH

STATE ENGINEER AND SURVEYOR

OF THE

STATE OF NEW YORK

1908

Coöperative Topographic Survey of New York.

DEPARTMENT OF THE INTERIOR,

UNITED STATES GEOLOGICAL SURVEY.

WASHINGTON, D. C., *January* 25, 1909.

Hon. FRANK M. WILLIAMS, *State Engineer and Surveyor, Albany, New York:*

DEAR SIR.— I have the honor to make the following report of the results of the coöperative topographic-survey of New York for the fiscal year 1908-1909, to and including December 31, 1908:

Allotments.

The terms of the supplemental agreement signed in June, 1908, provided for the continuation of the coöperative topographic survey of the State and extended the original agreement entered into by the State Engineer and the Director of the United States Geological Survey, June 30, 1905, to cover the details of such coöperation. In this supplemental agreement it was provided that the State and the United States Geological Survey should each expend an additional sum of not less than $8,000 during the government fiscal year ending June 30, 1909. Of the sum provided for coöperative surveys during the fiscal year ending June 30, 1908, there remained at the beginning of the field season $3,768.29, making the total sum available to June 30, 1909, $19,768.29. Of this sum, there had been expended on January 1, 1909, $14,-142.87, leaving a balance on the part of New York of $2,532.21, and the United States Geological Survey of $3,093.21, or a total of $5,625.42 to be expended for the payment of office salaries involved in the drafting of the maps for the preliminary field work of 1909.

Results.

The coöperative topographic work in New York was under the immediate supervisory charge of Mr. Frank Sutton, Geographer in charge of the Atlantic Division, the general charge of all such

work of the United States Geological Survey being under Mr. R. B. Marshall, Chief Geographer.

During the season of 1908 surveys were made in Warren, Hamilton, Saratoga, Steuben, St. Lawrence, Fulton, Sullivan, Ulster, Jefferson, Lewis, Livingston, Delaware, and Otsego counties, resulting in the completion of the Stony Creek and Bath quadrangles, and the partial completion of the Monticello, Neversink and Delhi quadrangles. Preliminary work was also extended on the Mt. Vision, Canton, Antwerp and Hammond quadrangles. The total area mapped was 872 square miles for publication on the scale of 1 to 62,500, with a contour interval of 20 feet.

For the control of the above areas 202 miles of primary levels and 762 miles of secondary levels were run, in connection with which 45 permanent bench marks were established and 9,627 useful elevations were determined. In addition, 122 miles of primary and 4,291 miles of secondary road traverse were run.

Progress to Date.

Prior to the season of 1908–9 there had been surveyed and mapped 209 quadrangles. At the conclusion of the present field season, therefore, 211 atlas sheets had been completed and 3 partially completed, representing the topography of 39,444 square miles. The total area of the State is 49,204 square miles, thus leaving 9,760 square miles yet to be mapped.

Field Work in 1908.

Field work was commenced in May by Messrs. W. H. S. Morey, S. P. Floore, Fred Graff, Jr., and J. I. Gayetty, assistant topographers, who completed the Stony Creek quadrangle, and by L. C. Fletcher, topographer, who completed the Bath quadrangle. In June various other topographers took the field, and during the season the partial mapping of the Delhi quadrangle was accomplished by Mr. R. H. Chapman, topographer; the Monticello quadrangle by Mr. T. M. Bannon, topographer, later assisted by Mr. Morey; and the Neversink quadrangle by Mr. J. M. Whitman, topographer. Preliminary work was extended by Mr. R. C. Seitz, junior topographer, over the Canton, Antwerp, Hammond, and Mt. Vision quadrangles.

Office Work.

The final drawing of the Stony Creek and Bath quadrangles will be completed during the spring and will then be transmitted to the engraving division for publication. These are the only atlas sheets completed in New York that have not been engraved.

The following topographic sheets were published during the year 1908: Potsdam, Loon Lake, Warren (Pa.–N. Y.), Goshen and Port Jervis (N. Y.–N. J.).

Very respectfully,

GEO. OTIS SMITH,
Director.

REPORT

OF

Records and Gagings

AND

Discharge of Streams

IN THE

STATE OF NEW YORK

1908

By ROBERT E. HORTON,
Resident Engineer

Report on the Gaging of Streams for 1908.

Hon. Frederick Skene, *State Engineer and Surveyor:*

Dear Sir.— The following report contains the results of observations of water-levels along the lines of the Barge canal, as well as at gaging stations maintained in coöperation with the United States Geological Survey for the purpose of determining the discharge of streams throughout the State during the year 1908. About ninety gages have been maintained in connection with the Barge canal department, under the immediate direction of Mr. Wm. R. Hill, Special Deputy State Engineer. The mean daily elevations of water-surface at the different stations are published in this report. The discharge is determined at a few of these gaging stations, the methods used being analogous to those employed by the United States Geological Survey and hereafter described. As a rule two observations of water-level are made each day and the mean of the two has been used in determining the elevation of water-surface. Stations at Cohoes, Hoosick Falls, Glens Falls, Northville, Schaghticoke, Fort Hunter, Schenectady, Corinth, Utica, Troy, Trenton Falls, Schoharie Junction, and State dam, Little Falls are maintained during the four winter months, December to March, inclusive, by the United States Weather Bureau, under the direction of Mr. George T. Todd, Local Forecaster.

The work of stream gaging in connection with the Barge canal was under the general supervision of C. Arthur Poole, First Assistant Engineer, preceding July, 1906, and of Robert E. Horton, Resident Engineer, subsequently.

Most of the stations maintained by this Department are solely for the purpose of recording the water-level, and are not used to determine the discharge. In such cases readings are taken only to the nearest one-tenth foot. The elevation of the gage zeroes and the water-surface elevations deduced from the gage readings are determined with reference to the Barge canal datum.

An annual appropriation for stream gaging in coöperation with the United States Geological Survey was made by the State Legislature in each of the years 1900 to 1904 and again in 1906. The results of this work, which was carried on under the joint direction of the Division of Hydrography of the Geological Survey and the State Engineer and Surveyor, have been published in the reports of the State Engineer and Surveyor.

For the period January, 1905, to June 30, 1906, no coöperative fund was available. The gaging stations were, however, continued by the Geological Survey and the results have been included in the report of the State Engineer, thus maintaining the published series of records complete. The coöperative stream gaging was under the immediate direction of Robert E. Horton, Engineer, United States Geological Survey, from March, 1900, to June, 1906, and under direction of H. K. Barrows, Engineer, United States Geological Survey, subsequent to June, 1906.

METHODS EMPLOYED.

In the establishing of gaging stations no single method of gaging has been employed to the exclusion of others. In many instances two or more methods have been combined at a single station. The principal methods have been the use of dams as weirs in conjunction with records of the flow through turbines or other outlets at mills, and the current-meter method. Gagings by thin-edged weirs and through thin partitions or orifices have been used to some extent in the case of small streams. Surface-floats, rod-floats and the surface-slope methods are also used in cases where other methods cannot be utilized.

The gages at the coöperative stations are chiefly cypress planks with galvanized staple division marks and brass figures. At the Barge canal stations the original gages were mostly seven-eights-inch boards, with painted or burned division marks or figures.

During 1908 all the gages maintained by the Barge canal department have been rehabilitated. Worn portions of board gages have been replaced with gages made in sections from enamelled steel strips, subdivided decimally in one-tenth-foot widths. Weight-and-chain gages have been uniformly equipped with standard chain, standard adjustable weights and standard locks. Tape-and-

reel gages, United States Weather Bureau pattern, are also used.

In determining the discharge at dams and mills the method of procedure is as follows: A profile of the crest of the dam is obtained and is divided into sections, all points in a given section being nearly or precisely at the same elevation. The discharge over each section is computed for a series of crest-depths, ranging from zero to the extreme high-water mark. The summation of these sectional discharge curves furnishes data for a rating table for the entire dam, from which the volume of flow corresponding to any gage height can be read directly. When flash-boards are placed on dams, the conditions are reduced more nearly to those of a standard thin-edged weir, and Francis' well-known formula has been used in computing the discharge. The flow over waste-weirs, auxiliary spillways and flood overflows has been calculated in a manner similar to that used for dams. The amount of flow through head-gates, sluiceways, feeder gates and similar openings has been calculated from the formula for orifices.

In estimating the discharge through turbine water-wheels the results of tests, made at the testing flume of the Holyoke Water Power Company, have been largely depended upon, the mean discharge for each day having been computed from the observed working head, width of opening of speed gates and number of hours each wheel has run. A record of these facts is kept at each of the stations where there are mills in connection with dams.

One difficulty encountered in gaging northern streams results from the accumulation of ice during the winter season. It has been found impossible to keep some dams clear of ice, and an effort is made to keep a record of the length of the clear and unobstructed portion of the dam, from which a correction in the calculated flow can be made.

The method of gaging at dams and mills and the necessary data for the calculation of discharge over weirs or through turbines may be found in the water-supply and irrigation papers of the United State Geological Survey, Nos. 150 and 200.[a]

For current-meter gaging stations a modified form of small Price meter has generally been used.

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a "Weir Experiments, Coefficients and Formulas" and "Turbine Water Wheel Tests and Power Tables," by Robert E. Horton.

By courtesy of the owner, arrangements were made during 1907 to rate the current-meters used by the Department at an unused canal slip in the Albany lumber district. For the purpose of rating meters a track 120 feet long was laid alongside the canal slip. The meter to be rated is suspended from an outrigger attached to a car that runs on the track. The car is drawn at a uniform velocity along the track by means of a windlass and tackle. The car is run at various speeds covering the ordinary range of velocities occurring in rivers and canals and the time required and number of revolutions of the meter wheel during each run are recorded. From this data a rating table for the current-meter is prepared, by means of which the velocity of flow of a stream can be deduced from the observed revolutions per second of the meter wheel.

In making gagings of streams the usual method of procedure is to divide the stream into subsections usually of 5 to 10 feet width. The velocity is usually measured at the median point of each subsection by means of the current-meter, the meter wheel usually being submerged six-tenths of the depth of the stream. The revolutions of the meter wheel are recorded for a period of 100 seconds. The time is noted by means of a stop-watch reading to one-fifth second and the period of observation is usually subdivided into two intervals of fifty seconds each. Careful soundings are taken at times when the conditions are favorable and standard cross-sections are prepared therefrom, from which the areas of the subsections can be taken out more accurately than from the individual soundings made in connection with the meter measurements. A simple multiplication of the velocity in each subsection by the cross-sectional area to which it applies gives the rate of discharge for the subsection. A summation of the quantities for the several subsections gives the total measured volume of flow. A river-height gage is established at each current-meter station, from which the stage of the stream is observed once or twice daily. Current-meter measurements of the discharge are made from time to time as opportunity permits. After a sufficient number of discharge measurements have been made they are plotted, using the gage heights of the stream as ordinates and the measured discharge as abscissas. A mean curve is drawn through

the plotted points showing the discharge rate in second-feet as a function of the gage reading. By means of this curve the average discharge rate for each day is deduced from the record of the height of the stream kept by the gage reader.

Gages are read each morning and night as a rule, although in some cases readings are taken only once daily. Readings are taken as a rule only to the nearest tenth or half-tenth of a foot. In some cases where there are two or more gages in a reach of a stream in which the slope is very slight, the mean daily elevation of the down-stream gage will on some days be higher than that shown by the up-stream gage. These differences are usually only a very few hundredths of a foot and result from various causes, including the error due to reading gage to nearest tenth foot, change in water-level between the time of reading the two gages, change in slope due to rising or falling of the stream between the two daily readings used in compiling the mean, effect of wind, etc. Instances of this character will be observed on Hudson river above Crocker's Reef dam and on Oneida and Seneca rivers, and where the differences are small they are not the result either of errors in readings or the use of an erroneous gage datum.

At some locations where discharge data are required, it is impossible to obtain a permanent rating table owing to continued or irregular changing of the regimen of the stream by backwater from dams, ice or log obstructions, or from the growth of aquatic vegetation. At such locations the discharge is determined from such measurements as can be made with corrections of the gage heights determined from a comparison of the discharge at different times.

The principal sources of error in gaging streams by the current-meter method are due to the effect of slack, or nearly slack water in any part of the cross-section, or to backwater from dams, from obstructing ice, or from tributaries entering below the gaging station, thereby causing the river stage to rise at times without a proportional increase in the discharge. In accordance with the well-known Kutter formula, the volume of flow in an open channel is a function of the slope, the area of cross-section and the wetted perimeter. When a stream is rising, the slope is usually greater at a given stage of the stream than at the same stage when falling.

Northern streams, as a rule, rise rapidly and fall gradually, so that the stream is falling on the majority of days of the year. The error from the above source is small, inasmuch as the discharge varies only as the square root of the slope. The principal difficulty encountered results from the freezing over of streams in winter. The ice serves greatly to increase the wetted perimeter of the measuring section, thereby modifying the rating curve. Whenever practicable, discharge measurements during winter months are made through the ice.

When streams are ice-covered, an opening is kept underneath the gage and the gage reading is taken directly to water-surface level, as in summer. A record is also kept of the ice thickness in inches.

The accuracy of individual current-meter measurements depends chiefly upon the number of the velocity observations and soundings taken in the cross-section. During freshets and at times when ice or debris is floating on the stream's surface, the current-meter cannot be submerged to a six-tenths depth and readings are taken by holding the meter about one foot below the surface. As a check on the accuracy of the general results and to determine suitable coefficients for the estimation of the mean velocity from that obtained by current-meter, vertical velocity curves are made from time to time.

Owing to the conditions above described and other unfavorable characteristics of New York streams, the difficulty of maintaining continuous gaging records, which will show with sufficient accuracy the discharge rate day by day throughout the year, is very great. This is especially true in streams whose discharge fluctuates between wide limits.

In many cases methods of gaging applicable at low and ordinary stages may not give equally reliable results during freshets; or the reverse may be true, the results being most accurate for high water.

For mill streams, where the water is held back as pond-storage during the dry season, it is impossible to determine the natural regimen of flow of the stream. This is especially true with reference to Sundays and holidays, when mills are not running. If, at any time, the water-wheels are stopped when the water stands

below the level of the crest line of the dam, the flow in the stream channel below will be *nil,* or at best, will equal only the leakage of the dam, flumes, or penstocks.

The relation existing between the canals of New York and the streams of the central portion of the State is very complex. Diversion from the head waters of a number of streams for the supply of canals virtually reduces their effective drainage areas. As a result, the summer watershed may be materially less in area and differ widely in its water-yielding characteristics from the region tributary to the stream when the canals are not in operation.

In this connection attention should be called to the maximum daily discharge for each month as given in the following report. This is obtained from the mean of the gaging readings on the day of maximum discharge. As a rule, the discharge at some time in the course of the day was considerably greater than the average for the twenty-four-hour period.

In connection with the gaging stations it is necessary to employ, as observers, persons living near the site selected for the measureing section — those who, as a rule, have had no previous experience in similar work. Their observations are forwarded at the end of each week. As a check on the records so obtained, inspection trips are made at frequent intervals and independent gage readings taken by the hydrographer. The close agreement found in most cases testifies to the intelligent and careful work of the observers.

ST. LAWRENCE RIVER DRAINAGE.

GENERAL FEATURES.

St. Lawrence river receives the flow of a number of New York streams having their sources in a northerly slope of the Adirondacks and fed by the numerous lakes with which the region is dotted. Some of these rivers, as the Grass, Raquette and St. Regis, lie entirely within the United States; others, notably Salmon, Trout, Chateaugay and English rivers, cross the international boundary and flow northward into the St. Lawrence in Canada, as does also Richelieu river, the outlet of Lake Champlain. The following table gives a list of the principal tributaries of the St. Lawrence in the United States, with the areas drained by them determined chiefly from Bien's Atlas of the State of New York:

Drainage Areas of St. Lawrence River tributaries in the United States.

	Square miles.		Square miles
Oswegatchie river	1,609	Salmon river *a*	273
Grass river	637	Trout river *b*	129
Raquette river	1,219	Chateaugay river *b*	199
St. Regis river	910	English river *b*	53
Little Salmon river *a*	103	Lake Champlain *b*	*c*7,867

a Above junction near international boundary. *b* Above outlet at New York State line.
c Figure previously published, 8,187; the above is a revision.

The St. Lawrence drains, through Lake Champlain, an area of 4,560 square miles in the State of Vermont. This drainage is practically all from Missisquoi, Lamoille and Winooski rivers and Otter creek.

LAKE CHAMPLAIN DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Lake Champlain occupies a long and narrow valley, extending in a north-south direction and forming a part of the boundary between New York and Vermont. The elevation of the lake is about ninety-five feet above tide and the water-surface area is 436 square miles.

The drainage basin is irregular in form, being about seventy-five miles wide from a point opposite Middlebury, Vt., northward to the outlet of the lake at Rouses Point, on the international

boundary. South of Middlebury the average width of the basin is about thirty-five miles and the lake itself is very narrow, forming virtually a drowned river.

The tributary region is rugged and mountainous, mostly covered with forest and with little depth of soil except in the stream valleys. The drainage is received almost entirely through large tributaries, there being little direct coast drainage into the lake. The outlet of the lake is Richelieu river, which flows northward from Rouses Point to St. Lawrence river.

In estimating the run-off from this basin in previous years the drainage area has been taken as 7,750 square miles. Maps have recently become available from which the area of the lake and its tributary drainage basin have been more accurately determined, as shown in the following table: *a*

a Table here presented is a revision of that appearing in the 1907 report.

Drainage Areas Tributary to Lake Champlain.

LOCALITY.	Place to place area.	Sub-total area.	Main total area.
	Square miles.	*Square miles.*	*Square miles.*
Pike river, and adjacent area in Canada	....	242.0 *a*	....
Missisquoi river in Canada	....	245.0 *b*	....
Land area in Canada above outlet	....	....	487.0
Missisquoi river in Vermont	....	615.0 *b*	
(Total Missisquoi river, 860 square miles)			
Lamoille river	....	725.0 *b*	
Winooski river	....	995.0 *b*	
Otter creek	....	935.0 *b*	
Eastern coast drainage	....	534.4 *b*	
Mettawee, Poultney and Castleton rivers in Vermont	....	376.0 *c*	
Land area in Vermont, except islands	....	....	4,180.4
Wood creek above Smiths Basin	18.60	....	
Big creek above junction with Wood creek	35.16	53.76	
Wood creek, Smith's Basin to Fort Ann	9.90	63.66	
Halfway creek above Kane's Falls	78.82	....	
Halfway creek, Kane's Falls to junction with Wood creek at Fort Ann	6.69	85.51	
Wood creek at Fort Ann, including Halfway creek	....	149.17	
Wood creek, Fort Ann to junction with Mettawee	55.73	204.90	
Mettawee river in Vermont	151.9	....	
Mettawee river in New York	55.7	....	
Total, Metawee river	....	207.6	
Total, Wood creek and Metawee river at junction	....	412.5	
Wood creek, junction Metawee river to Whitehall	13.65	426.15	
Wood creek, Whitehall to junction with Poultney river	1.65	427.80	
Castleton river, in Vermont	100.9	....	
Poultney river, including Castleton river, in Vermont	....	254.8	
Poultney river in New York	....	11.0	
Total, Poultney river to junction with Wood creek	....	265.8	
Total Wood creek and Poultney river at junction	....	....	693.60
Wood creek-Mettawee and Poultney rivers in N. Y	....	....	286.90
Lake George outlet	....	220.1	
Bouquet river	....	268.1 *c*	
Ausable river	....	521.3 *d*	

See next page for foot-notes.

Drainage Area Tributary to Lake Champlain — (Concluded).

LOCALITY.	Place to place area.	Sub-total area.	Main total area.
	Square miles.	*Square miles.*	*Square miles.*
Little Ausable river	....	75.1 *d*	
Saranac river	....	629 6 *d*	
Little Chazy river	....	63 8 *c*	
Big Chazy river	....	299 4 *d*	
Western coast drainage	....	344 6 *d*	
Land area in New York, except islands	....	....	2,708.9
Islands in New York	....	55 2 *c*	
Total land area above outlet	....	....	7,431.5
Water-surface in Canada	....	16 5 *a*	
Water-surface in United States	....	419 1 *e*	
Total water-surface	....	435 6	
Total drainage area above outlet	....	....	7,867.1
Richelieu river, Rouses Point to Chambly	310.0 *a*	....	
Total drainage area above Chambly	....	....	8,177.1
Richelieu river, Chambly to mouth	626 3 *a*	....	
Richelieu river, total	....	936.3	
Total drainage area above mouth	....	....	8,803.4

a From maps of Canadian Geological Survey. Scale: 4 miles = 1 inch.
b From United States post-route maps. Scale: 12.5 miles - 1 inch.
c From Topographic maps of U. S. G. S. Scale: 1 mile 1 inch (nearly).
d From Bien's Atlas of New York. Scale 2.5 miles - 1 inch.
e From charts of U. S. Coast and Geodetic Survey. Scale: 1 : 40,000.

RICHELIEU RIVER AT FORT MONTGOMERY.

A record of the height of Lake Champlain at Rouses Point, at the head of Richelieu river, the outlet of the lake, has been kept at Fort Montgomery, by the United States Corps of Engineers, beginning in 1875. Through the courtesy of Capt. Harry Taylor, the gage readings taken by William McComb, the fort keeper, at 9 a. m. each day, are reported weekly to the United States Geological Survey.

The depth of the water is taken on a reference mark on the base of the scarp wall, at the north face of bastian B, about three feet from the angle with the east curtain of Fort Montgomery. This reference point is 1.50 feet above an assumed zero, and 1.50 is added to the measured depth to determine the gage reading. In winter the depth as the water rises in a hole in the ice is commonly taken. On windy days the depth is taken in a well within the fort inclosure, by measuring the depth on a flagstone in the bottom of the well.

Elevations at Fort Montgomery.	Feet above tide.
Elevation of reference point on scarp wall of Fort Montgomery *a*	94.998
Elevation of gage zero	93.501
Assumed high water, Lake Champlain	102.611
Assumed low water, Lake Champlain	93.361

a United States Deep Waterways Report, part 1, p. 429.

The range of rise and fall of the lake is thus seen to be 9.25 feet, representing an available storage volume of about six inches on the entire catchment area above the outlet.

The land drainage area above Rouses Point is 7,432 square miles. The water-surface of the lake is 436 square miles, making the total area at the foot of the lake 7,867 square miles.

The daily discharge of the lake has been determined from observations of the depth and discharge over the Chambly dam, thirty-five miles below the head of Richelieu river, made in 1898 by the United States Board on Deep Waterways. A rating table has been derived from the observations at the Chambly dam and the gage readings taken at Rouses Point. The area tributary to the river between Rouses Point and Chambly is 310 square miles, making the total drainage basin above Chambly, 8,177 square miles.

Mean Daily Gage Height, in Feet, of Richelieu River at Fort Montgomery.

DAY.	Jan.	Feb.	March	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	4.45	3.9	4.2	5.8	6.2	5.1	3.05	1.7	0.9	0.4	—0.3	—.05
2	4.4	3.75	4.2	5.85	6.15	5.05	2.9	1.7	.9	.3	— .25	—.2
3	4.4	3.7	4.1	5.8	6.1	5.05	2.9	1.65	.8	.2	— .25	—.3
4	4.6	3.6	4.05	5.8	6.25	4.9	2.85	1.65	.9	.2	— .2	.0
5	4.4	3.6	4.0	5.85	6.25	4.85	2.7	1.75	1.05	.25	— .3	—.4
6	4.5	3.7	4.05	5.80	6.3	4.8	2.8	1.5	1.1	.25	— .35	—.4
7	4.45	3.55	3.9	5.75	6.5	4.75	2.6	1.5	.75	.4	— .3	—.2
8	4.4	3.5	4.0	5.8	6.4	4.6	2.6	1.45	.7	.25	— .15	—.35
9	4.3	3.5	3.8	5.75	6.4	4.55	2.55	1.45	.85	.0	— .2	—.4
10	4.2	3.5	3.8	5.95	6.3	4.45	2.45	1.5	.7	.05	— .45	—.3
11	4.2	3.45	3.85	5.85	6.4	4.4	2.6	1.5	.7	.2	— .3	—.05
12	4.2	3.4	3.7	5.8	6.35	4.3	2.4	1.5	.6	.15	— .55	—.2
13	4.15	3.5	3.8	5.9	6.3	4.15	2.3	1.4	.55	.3	— .6	—.1
14	4.0	3.4	3.9	5.9	6.35	4.1	2.25	1.4	.50	.3	— .45	—.2
15	4.1	3.55	4.05	5.9	6.35	4.0	2.2	1.25	.45	.2	— .45	—.15
16	4.15	3.75	4.05	5.8	6.4	3.9	1.95	1.3	.45	.15	— .4	—.2
17	4.1	3.95	4.2	5.8	6.2	3.9	2.1	1.6	.5	.15	— .4	—.25
18	4.05	4.1	4.25	5.8	6.25	3.95	2.0	1.25	.5	.1	— .4	—.25
19	4.0	4.25	4.25	5.75	6.3	4.0	1.9	1.4	.3	.1	— .2	—.1
20	4.1	4.35	4.35	5.85	6.1	3.9	1.95	1.15	.4	.1	— .4	—.15
21	3.95	4.45	4.4	5.7	6.0	3.7	2.05	1.2	.65	.1	— .2	—.2
22	4.0	4.4	4.35	5.65	5.95	3.6	2.0	1.3	.45	.1	— .2	— 25
23	3.95	4.4	4.4	5.6	6.0	3.6	1.95	1.1	.3	.05	— .15	—.25
24	3.9	4.4	4.5	5.5	5.75	3.6	1.9	1.1	.45	.05	— .2	—.2
25	3.95	4.45	4.55	5.7	5.6	3.4	1.9	1.05	.4	......	— .25	—.2
26	3.85	4.4	4.8	5.6	5.65	3.35	1.9	1.0	.45	......	+ .2	—.3
27	3.8	4.35	4.75	5.6	5.5	3.3	1.9	.95	.45	......	— .2	—.15
28	3.8	4.3	5.1	5.75	5.45	3.2	1.8	.9	.5	......	— .3	—.25
29	3.8	4.25	5.35	5.9	5.4	3.3	1.85	1.0	.35	......	— .2	—.2
30	3.7	.....	5.6	6.0	5.3	3.1	1.8	.9	.4	......	— .1	.....
31	3.9	......	5.8	......	5.2	......	1.75	.9	......	......	......	—.25

NOTE.— Gage heights recorded October 25 to 31 are omitted. They were probably incorrect owing to water not having free access to the gage. After October 31 readings were made to a reference point outside the fort and reduced to gage datum.

Computations of daily discharge and run-off for 1908 are withheld, pending the acquisition of additional data.

WOOD CREEK DRAINAGE BASIN.

DESCRIPTION.

Wood creek flowed originally along a tortuous course in a flat valley skirted by bold slopes, the general course being northerly from a point five miles east of Hudson river at Fort Edward. From Smiths Basin northerly, it is alternately paralleled by and canalized to form Champlain canal, so that the flow of this portion of the stream is artificially controlled.

Halfway creek, the principal tributary of Wood creek from the west, enters at Fort Ann. This stream receives the drainage from Putnam mountain and an adjacent group of small lakes. A fall of 60 feet occurs at Kanes Falls. Wood creek is joined by Mettawee river a short distance above Whitehall. The drainage from Poultney and Castleton rivers enters the arm of Lake Champlain through which Wood creek flows below Whitehall.

Drainage Areas of Wood Creek and Mettawee River.a

LOCATION.	SQUARE MILES.	
	Place to place.	Total.
Wood creek above Smith's Basin	18.60	....
Big creek above junction with Wood creek	35.16	53.76
Wood creek, Smiths Basin to Fort Ann	9.90	63.66
Halfway creek above Kanes Falls	78.82	....
Halfway creek, Kanes Falls to junction with Wood creek at Fort Ann	6.69	85.51
Wood creek at Fort Ann, including Halfway creek	....	149.17
Wood creek, Fort Ann to junction with Mettawee river	55.73	204.90
Mettawee river in Vermont	151.9	....
Mettawee river in New York	55.7	....
Total, Mettawee river	....	207.6
Total, Wood creek and Mettawee river at junction	....	412.5
Wood creek, junction with Mettawee river to Whitehall	13.65	426.15
Wood creek, Whitehall to junction with Poultney river	1.65	427.80

a The above table is a revision of that given in preceding reports.

WOOD CREEK BELOW DAM AT WHITEHALL, N. Y.

A gage has been maintained by this Department below the dam at Whitehall since January 22, 1905. This gage gives a record of the fluctuation in level of water in the arm of Lake Champlain into which Wood creek discharges.

The original gage, erected by Mr. D. B. LaDu, was attached to the face of the Champlain Silk Mill on the right-hand side of the stream below the dam. A new gage attached to the face of

the timber docking below the dam on the left-hand side of the stream is now used. The zero mark of each gage is at elevation 73.0, Barge canal datum. The observer and time of reading are the same as for the gage above the dam.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Wood Creek, at Whitehall N. Y. [b]

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	98.00	97.80	97.60	100.30	100.20	97.85	96.30	95.75	94.60	94.45	93.75	93.55
2	98.15	97.80	97.55	100.15	99.50	97.85	96.20	95.80	94.60	94.50	93.80	93.45
3	98.20	97.65	97.55	100.60	99.60	97.95	96.15	95.65	94.50	94.40	93.65	93.55
4	98.05	97.60	97.55	100.60	99.35	97.95	96.15	95.55	94.45	94.75	93.70	93.50
5	97.95	97.70	97.65	100.80	99.55	97.85	96.00	95.60	94.35	94.65	93.80	93.55
6	97.75	97.70	97.50	100.85	99.70	97.85	96.00	95.70	94.30	94.50	93.75	93.55
7	97.65	97.70	97.60	100.85	99.65	97.80	95.90	95.60	94.45	94.60	93.65	93.60
8	97.70	97.60	97.55	100.80	100.30	97.75	95.85	95.50	94.60	94.55	93.65	93.60
9	97.75	97.80	97.50	100.80	100.30	97.45	95.80	95.50	94.45	94.55	93.55	93.70
10	97.80	97.70	97.55	100.60	100.50	97.50	95.85	95.60	94.45	94.65	93.60	93.75
11	97.75	97.60	97.55	100.50	100.30	97.75	95.75	95.50	94.40	94.45	93.65	93.80
12	97.70	97.55	97.50	100.40	100.20	97.85	95.65	95.55	94.50	94.35	93.65	93.85
13	97.60	97.60	97.75	100.40	100.45	97.90	95.65	95.60	94.60	94.15	93.55	93.85
14	97.40	97.65	98.35	100.60	100.15	97.80	95.80	95.55	94.70	94.00	93.55	93.85
15	97.60	98.35	99.10	99.40	100.15	97.85	95.70	95.55	94.70	94.15	93.55	93.85
16	97.60	102.70	99.35	100.70	100.10	97.75	95.65	95.60	94.60	94.20	93.55	93.95
17	97.55	101.05	99.35	100.00	99.70	97.70	95.60	95.45	94.65	94.05	93.65	93.95
18	97.60	100.00	99.35	99.80	99.70	97.60	95.60	95.55	94.50	94.25	93.55	94.10
19	97.65	98.20	99.20	99.80	99.80	97.60	95.50	95.40	94.55	94.10	93.45	94.00
20	97.70	97.95	99.10	99.95	99.55	97.80	95.45	95.50	94.60	94.05	93.50	94.05
21	97.70	97.90	98.80	100.00	99.70	97.65	95.50	95.50	94.75	94.00	93.55	93.95
22	97.60	97.80	98.70	99.80	99.45	97.60	95.55	95.45	94.65	94.00	93.55	93.90
23	97.50	97.80	98.70	99.60	99.35	97.50	95.55	95.40	94.65	93.95	93.45	93.90
24	97.50	97.90	98.85	99.45	99.20	97.40	95.60	95.40	94.55	93.90	93.50	93.85
25	97.55	97.75	98.85	99.20	99.10	97.40	95.55	95.15	94.50	93.95	93.65	93.95
26	97.60	97.75	99.00	99.05	98.50	97.20	95.65	94.90	94.55	93.90	93.65	93.85
27	97.65	97.75	99.15	99.20	98.35	96.95	95.65	94.85	94.65	93.80	93.55	93.95
28	97.65	97.65	99.15	99.15	98.35	96.75	95.65	94.80	94.65	93.80	93.65	94.10
29	97.65	97.80	99.15	99.15	97.90	96.65	95.65	94.85	94.65	93.70	93.55	94.15
30	97.60	......	99.65	99.60	97.80	96.40	95.60	94.85	94.60	93.75	93.50	94.25
31	97.60	......	100.20	......	97.90	......	95.70	94.80	......	93.65	......	94.10

b Arm of Lake Champlain, below Whitehall dam.

WOOD CREEK ABOVE DAM AT WHITEHALL, N. Y.

A record of the stage of Wood creek has been kept since September 19, 1904, when a gage was established above the stone dam of the Champlain Silk Mill, by D. B. LaDu of this Department. The gage board was formerly fastened to retaining wall on east side of the creek, near Clinton avenue, about seventy feet above the right-hand end of the dam. The present crest gage is located in the right-hand abutment of the dam. The gage is graduated in feet and tenths and is read twice daily. The zero of gage is placed at same elevation as crest of dam, the elevation of which is 107.5. The gage was read by S. H. Pearson preceding October 16, 1908, after which date the observer was Howard L. May.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Wood Creek, at Whitehall, N. Y. b

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	110.60	109.45	109.50	110.60	110.65	109.55	108.60	108.55	108.00	108.35	109.45	108.45
2	110.50	109.45	109.60	110.50	110.55	109.40	108.60	108.55	107.90	108.45	109.40	108.55
3	110.30	109.20	109.50	110.20	111.00	109.20	108.50	108.55	107.75	108.55	109.35	108.65
4	110.00	109.05	109.30	110.10	110.90	109.10	108.45	108.35	107.85	108.70	109.25	108.70
5	109.65	109.05	109.20	109.90	110.60	109.00	108.55	108.50	108.65	108.75	109.35	108.70
6	109.45	109.00	109.30	110.20	110.55	108.95	108.50	108.55	110.05	108.60	109.30	108.85
7	109.40	109.00	109.40	110.40	110.45	109.10	108.45	108.65	110.05	108.70	109.45	108.95
8	109.45	108.95	109.30	110.50	111.10	109.10	108.40	109.00	109.00	108.90	109.25	108.95
9	109.30	108.90	109.20	111.45	111.20	109.00	108.40	109.10	108.50	108.90	109.15	109.05
10	109.25	108.80	109.30	111.40	111.30	109.30	108.50	108.95	108.10	109.10	109.15	109.15
11	109.20	108.75	109.30	111.30	111.00	109.10	108.50	108.55	107.90	108.75	109.10	109.15
12	109.30	108.80	109.55	111.10	110.45	108.90	108.60	108.40	107.80	108.85	109.10	109.25
13	109.25	108.60	110.25	110.90	110.20	109.00	108.40	108.30	108.50	108.65	109.10	109.15
14	109.20	108.70	111.80	111.50	110.30	108.90	108.20	108.25	108.15	108.75	109.00	109.25
15	109.20	111.35	112.85	110.60	110.30	109.30	108.10	108.40	108.00	108.60	108.85	109.30
16	109.20	115.50	113.00	111.00	110.10	110.60	108.15	108.65	108.00	108.85	108.75	109.35
17	109.10	114.50	112.10	110.60	110.00	109.60	108.40	108.80	107.95	108.95	108.75	109.30
18	109.10	112.75	111.20	110.20	109.90	109.40	108.15	108.80	107.95	109.15	108.55	109.30
19	109.00	110.80	110.50	110.70	110.00	109.45	108.70	108.60	110.00	109.25	108.50	109.35
20	108.95	110.50	110.20	110.55	110.00	109.75	108.50	108.45	*a*	109.15	108.45	109.45
21	108.90	110.10	109.65	110.20	109.90	109.50	108.15	108.35	108.55	109.30	108.40	109.50
22	109.30	109.80	109.85	110.20	110.10	109.60	108.05	108.40	108.30	109.15	108.45	109.55
23	109.20	109.30	110.70	110.10	110.00	109.50	108.10	108.95	108.30	109.35	108.35	109.55
24	109.15	109.30	111.65	109.90	109.90	109.40	[illegible]	108.85	108.30	109.40	108.45	109.40
25	109.20	109.20	112.05	109.85	109.75	109.50	108.05	108.50	108.20	109.25	108.55	109.50
26	109.20	109.30	111.40	109.80	109.65	109.10	109.05	108.40	108.00	109.35	108.50	109.65
27	109.50	110.10	111.20	109.80	109.50	108.90	108.60	108.35	108.05	109.40	108.45	109.75
28	109.50	110.05	111.05	110.55	109.30	108.70	108.25	108.35	108.05	109.40	108.40	109.85
29	109.40	109.90	110.95	110.75	109.35	108.65	108.15	108.35	108.35	109.45	108.35	109.95
30	109.40	......	111.00	110.45	109.60	108.60	108.20	108.55	108.25	109.45	108.25	109.95
31	109.25	......	111.10	......	109.60	......	108.20	108.30	......	109.50	......	110.05

a No record. *b* Above dam.

METTAWEE RIVER.

DESCRIPTION.

Mettawee river is an interstate stream, rising in Dorset mountains, Vermont, crossing the State line into New York at Granville and entering the south arm of Lake Champlain below Whitehall. The drainage basin is a rugged area of rock, mostly forest covered, and tributaries are rather numerous and branching, there being no lakes or marshes. Near Whitehall the stream joins Wood creek.

METTAWEE RIVER NEAR WHITEHALL, N. Y.

A temporary low-water station was established August 25, 1908, by George M. Brett, near the second highway bridge above the confluence of Mettawee river and Wood creek, and about two miles from Whitehall.

The channel is straight for about 150 feet up-stream, and for about 300 feet down-stream. Both banks are subject to overflow.

The bed is fine gravel and somewhat shifting. There is one channel at all stages. The velocity is always good.

Discharge measurements have been made during low water, about 150 feet below the gage, by wading.

A vertical staff gage, which has been read twice daily by B. H. Moore, is fastened near the right bank about 150 feet down-stream from the highway bridge. It is referred to the following bench-mark: Chisel scratches on top, left-hand corner, down-stream end of second iron floor-beam, left abutment, elevation 14.38 above zero of gage.

The results of miscellaneous measurements of Wood creek and Mettawee river are given in the State Engineer's report for 1904, pp. 546 and 547.

Mean Daily Gage Height, in Feet, of Mettawee River at Whitehall, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	1.05	1.00	1.20	1.08
2	......	1.12	1.15	1.12	1.05
3	......	1.05	1.08	1.18	1.10
4	......	1.02	1.18	1.05	1.08
5	......	1.22	1.05	1.15	1.05
6	......	1.15	1.18	1.15	....
7	......	1.02	1.15	1.10	....
8	......	1.10	1.10	1.08	....
9	......	1.00	1.08	1.05	....
10	......	1.02	1.05	1.08	....
11	......	1.00	1.15	1.10	....
12	......	1.02	1.05	1.12	....
13	......	1.00	1.20	1.12	....
14	......	1.00	1.18	1.10	....
15	......	1.00	1.10	1.10	....
16	......	1.00	1.10	1.08	....
17	......	1.02	1.10	1.12	....
18	......	1.00	1.10	1.10	....
19	......	1.00	1.00	1.12	....
20	......	1.00	1.02	1.12	....
21	......	1.00	1.10	1.12	....
22	......	.98	1.02	1.10	....
23	......	1.00	1.08	1.08	....
24	......	1.00	1.08	1.08	....
25	1.15	1.00	1.05	1.08	....
26	1.12	1.00	1.02	1.08	....
27	1.10	1.00	1.05	1.08	....
28	1.18	1.00	1.10	1.08	....
29	1.20	1.00	1.20	1.05	....
30	1.02	1.00	1.25	1.08	....
31	1.00	......	1.22	......	....

NOTE.—River frozen over December 5 to 28.

Current-meter Discharge Measurements of Mettawee River near Whitehall, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Sq. Ft.*	*Feet.*	*Sec. Ft.*
Aug. 25	George M. Brett	22	13.5	1.15	18.8
Sept. 19	C. R. Adams	19	9.6	1.00	10.6

Rating Table for Mettawee River near Whitehall, N. Y., for 1908.

GAGE HEIGHT.	Discharge.
Feet.	*Second-feet.*
0.90	7
1.00	11
1.10	16
1.20	23
1.30	33

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It s based on two discharge measurements made during 1908 and is fairly well defined.

Mean Daily Discharge, Second-feet, of Mettawee River at Whitehall, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	14	11	23	15
2	......	17	20	17	14
3	......	14	15	22	16
4	......	12	22	14	15
5	......	25	14	20	14
6	......	20	22	20	......
7	......	12	20	16	......
8	......	16	16	15	......
9	......	11	15	14	......
10	......	12	14	15	......
11	......	11	20	16	......
12	......	12	14	17	......
13	......	11	23	17	......
14	......	11	22	16	......
15	......	11	16	16	......
16	......	11	16	15	......
17	......	12	16	17	......
18	......	11	16	16	......
19	......	11	11	17	......
20	......	11	12	17	......
21	......	11	16	17	......
22	......	10	12	16	......
23	......	11	15	15	......
24	......	11	15	15	......
25	20	11	14	15	......
26	17	11	12	15	......
27	16	11	14	15	......
28	22	11	16	15	......
29	23	11	23	14	......
30	12	11	28	15	......
31	11	......	25	......	......

Monthly Discharge of Mettawee River at Whitehall, N. Y.
[Drainage area, 206 square miles.]

MONTH.	Discharge in Second-feet.				Run-off, Depth in inches on drainage area.
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	
1908.					
August 25-31	23	11	17.3	.084	.02
September	25	10	12.5	.061	.07
October	28	11	16.9	.082	.09
November	23	14	16.4	.080	.09
December 1-5	16	14	14.8	.072	.01

POULTNEY RIVER.

DESCRIPTION.

Poultney river rises in a group of lakes in Rutland county, Vt. Above Poultney the drainage is rugged and precipitous. From Poultney to its outlet in the south arm of Lake Champlain the thread of the river forms the boundary line between New York and Vermont.

Castleton river, the principal tributary, enters near Fair Haven, its drainage lying entirely in Vermont. Castleton river rises in a valley between two parallel ridges of the Green mountains, flows southward to Rutland, then westward through a low divide of the mountains and receives at Hydeville the outlet of Bomoseen lake. This lake in turn receives the discharge of a number of smaller tributary lakes. The water-surface elevation of Bomoseen lake is 413 feet above mean tide.

Drainage Areas of Poultney River. a

LOCATION.	Area.	
	Place to place.	Total.
	Square miles.	*Square miles.*
Bomoseen lake:		
Bomoseen lake, water-surface	....	3.9
Bomoseen lake, total drainage	....	38.2
Castleton river:		
Above Hydeville	57.8	96.0
Hydeville to mouth	4.9	100.9
Poultney river:		
At gaging station near Fair Haven	78.1	....
Above Castleton river	78.4	179.3
Junction with Castleton river to Carver Falls	10.6	189.0
Carver Falls to mouth	75.9	265.8

a From Whitehall, Castleton, Mettawee and Fort Ann sheets of the United States Geological Survey topographic atlas.

POULTNEY RIVER AT FAIR HAVEN, VT.

A temporary low-water station was established August 26, 1908, by George M. Brett, at the Delaware & Hudson railroad bridge, about one-half mile above Castleton river, and about two miles from Fair Haven.

Discharge measurements have been made by wading during low water.

A vertical staff gage, which has been read twice daily by Frank Brooks, is attached to the remains of a masonry dam, directly under the Delaware & Hudson railroad bridge. It is referred to the following bench-mark: Chisel scratches on remains of masonry dam, up-stream face, beside gage, 21.2 feet from bolt in left abutment of railroad bridge, elevation 3.66 feet above zero of gage.

Mean Daily Gage Height, in Feet, of Poultney River at Fair Haven, Vt.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	.7	.7	1.0	.9
2	......	.7	.7	1.0	.95
3	......	.75	1.0	.9	....
4	......	.85	.7	.9	....
5	......	.8	.7	1.0	....
6	......	.8	.85	1.05	....
7	......	.85	.8	.9	....
8	......	.8	.8	.9	....
9	......	.8	.8	.8	....
10	......	.7	.8	.9	....
11	......	.6	.8	.9	....
12	......	.5	.8	.9	....
13	......	.5	.95	.95	....
14	......	.6	.9	1.0	....
15	......	.6	.9	1.0	....
16	......	.6	9	1.0	....
17	......	.6	.9	.9	....
18	......	.6	.9	1.0	....
19	......	.6	.85	1.0	....
20	......	.6	.8	1.0	....
21	......	.55	.8	1.0	....
22	......	.5	.8	1.0	....
23	......	.5	.8	.9	....
24	......	.5	.8	1.0	....
25	......	.5	.75	1.0	....
26	.9	.5	.75	.95	....
27	.9	.5	.8	1.0	....
28	.8	.5	.8	.9	....
29	.75	.6	.9	1.0	....
30	.7	.6	1.0	1.0	....
31	.7	......	1.0	......	....

Current-meter Discharge Measurements of Poultney River at Fair Haven, Vt.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Sq. Ft.*	*Feet.*	*Sec. Ft.*
Aug. 26	George M. Brett	5.3	2.14	0.92	4.70
Aug. 26	George M. Brett	8.0	3.94	0.92	5.49
Sept. 20	C. R. Adams	5.3	1.49	0.64	1.53

Rating Table for Poultney River at Fair Haven, Vt., for 1908.

GAGE HEIGHT.	Discharge.	GAGE HEIGHT.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*
0.50	.6	0.90	4.8
0.60	1.2	1.00	7.0
0.70	2.1	1.10	10.0
0.80	3.2		

NOTE.— The above table is not applicable for ice or obstructed channel conditions. It is based on three discharge measurements made during 1908 and is fairly well defined.

Mean Daily Discharge, Second-feet, of Poultney River at Fair Haven, Vt.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	2.1	2.1	7.0	4.8
2	......	2.1	2.1	7.0	5.9
3	......	2.6	7.0	4.8	......
4	......	4.0	2.1	4.8	......
5	......	3.2	2.1	7.0	......
6	......	3.2	4.0	8.5	......
7	......	4.0	3.2	4.8	......
8	......	3.2	3.2	4.8	......
9	......	3.2	3.2	3.2	......
10	......	2.1	3.2	4.8	......
11	......	1.2	3.2	4.8	......
12	......	.6	3.2	4.8	......
13	......	.6	5.9	5.9	......
14	......	1.2	4.8	7.0	......
15	......	1.2	4.8	7.0	......
16	......	1.2	4.8	7.0	......
17	......	1.2	4.8	4.8	......
18	......	1.2	4.8	7.0	......
19	......	1.2	4.0	7.0	......
20	......	1.2	3.2	7.0	......
21	......	.9	3.2	7.0	......
22	......	.6	3.2	7.0	......
23	......	.6	3.2	4.8	......
24	......	.6	3.2	7.0	......
25	......	.6	2.6	7.0	......
26	4.8	.6	2.6	5.9	......
27	4.8	.6	3.2	7.0	......
28	3.2	.6	3.2	4.8	......
29	2.6	1.2	4.8	7.0	......
30	2.1	1.2	7.0	7.0	......
31	2.1	......	7.0	......	......

Monthly Discharge of Poultney River at Fair Haven, Vt.

MONTH.	DISCHARGE IN SECOND-FEET.		
	Maximum.	Minimum.	Mean.
1908.			
August 26–31	4.8	2.1	3.27
September	4.0	.6	1.60
October	7.0	2.1	3.84
November	8.5	3.2	6.12

BOUQUET RIVER.

DESCRIPTION.

Bouquet river is tributary to Lake Champlain from the west at a point near Willsboro, N. Y. This stream drains an irregular rectangular area, its eastern edge lying at a distance of three to five miles from Lake Champlain. The basin is moderately rolling, and has an altitude varying from 300 to 800 feet in the valleys and central portion. The margins of the basin are formed by precipitous mountain ranges rising to altitudes of from 2,000 to 4,000 feet, the greater portion of this rise occurring usually within a few miles of the watershed divide. The interior basin contains a few small lakes and numerous narrow valley marshes. The main stream comprises two branches, the basin of the north branch occupying the northern half of the drainage area. All portions of the catchment area are well drained by branching tributaries.

Drainage Areas of Bouquet River. a

LOCATION.	AREA.	
	Place to place.	Total.
	Square miles.	*Square miles.*
Above Wadhams Mills	134.6	134.6
Wadhams Mills to Whallonsburg	20.8	155.4
Whallonsburg to junction of North branch	9.8	165.2
North branch	100.4	265.6
Junction of branches to Willsboro	3.9	269.5
Willsboro to mouth	2.5	272.0

a From Elizabethtown, Port Henry, Mount Marcy, Ausable and Willsboro sheets of the United States Geological Survey topographic atlas.

BOUQUET RIVER AT WILLSBORO, N. Y.

A temporary low-water station was established at Willsboro on August 14, 1904, and discontinued September 10, 1904. During that period seven discharge measurements were made. The results of gagings in 1904 are given in the State Engineer's report for 1904, pp. 541 and 542. This station was reëstablished as a temporary station on August 24, 1908, by George M. Brett, and a new gage placed in the vicinity of the previous one, but it was not connected by levels with the old datum. The station is about 1,500 feet below the New York and Pennsylvania Company's Champlain mill at Willsboro. The drainage area at this point is 270 square miles.

The channel is straight for about 200 feet above and below the gage. Both banks overflow at high water. The current is good except at extremely low stages. At high stages there may be backwater effect from Lake Champlain. The bed is of clay mixed with rocks.

Discharge measurements are made either by wading or from boat at a section about 150 feet above the gage.

A vertical, enameled iron staff gage is placed near the left bank and is read once daily under the direction of Mr. R. S. P. Mason, manager of the mill. It is referred to the following bench-mark: Four seven-penny nails driven in a horizontal row into the upstream side of the cut over the river from the left bank near a boat landing; elevation 9.50 feet above zero of gage.

From a comparison of discharge measurements it appears that the zero of the previous gage was about 0.38 feet above that of the new gage.

Mean Daily Gage Height, in Feet, of Bouquet River at Willsboro, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.
1908.				
1	......	0.95	0.8	.85
2	......	1.05	.95	.85
3	......	1.0	.95	.75
4	......	1.05	.85	.8
5	......	1.0	.85	.8
6	......	.95	.85	.8
7	......	.95	.9	.8
8	......	.9	.9	.75
9	......	.9	.85	.75
10	......	1.0	.9	.8
11	......	.95	.85	.8
12	......	1.0	.9	.85
13	......	.9	.85	.9
14	......	.85	.85	.8
15	......	.85	.85	.8
16	......	.8	.85	.8
17	......	.85	.8	.85
18	......	.8	.8	.85
19	......	.85	.85	.8
20	......	.8	.8	.75
21	......	.7	.8	.8
22	......	.75	.85	.8
23	......	.75	.8	.8
24	1.10	.8	.85	.85
25	.95	.8	.8	.8
26	1.0	.8	.85	.8
27	1.0	.75	.8	.8
28	1.1	.75	.8	.8
29	1.05	.8	.8	.85
30	1.1	.8	.85	.8
31	1.0	......	.8	......

Current-meter Discharge Measurements of Bouquet River at Willsboro, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Square feet.*	*Feet.*	*Second-feet.*
1908.					
Aug. 24...	Geo. M. Brett........................	46	84.9	1.08	74.5
Sept. 21...	C. R. Adams........................	30	16.3	.49	7.1

NOTE.— Measurements made by wading.

Rating Table for Bouquet River at Willsboro, N. Y., for 1908.

GAGE HEIGHT.	Discharge.
Feet.	*Second-feet.*
0.70	23
0.80	33
0.90	45
1.00	60
1.10	78

NOTE.— The above table is not applicable for ice or obstructed channel conditions. It is based on five discharge measurements made during 1904 and 1908.

Mean Daily Discharge, Second-Feet, of Bouquet River at Willsboro, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.
1908.				
1	......	52	33	39
2	......	69	52	39
3	......	60	52	28
4	......	69	39	33
5	......	60	39	33
6	......	52	39	33
7	......	52	45	33
8	......	45	45	28
9	......	45	39	28
10	......	60	45	33
11	......	52	39	33
12	......	60	45	39
13	......	45	39	45
14	......	39	39	33
15	......	39	39	33
16	......	33	39	33
17	......	39	33	39
18	......	33	33	39
19	......	39	39	33
20	......	33	33	28
21	......	23	33	33
22	......	28	39	33
23	......	28	33	33
24	78	33	39	39
25	52	33	33	33
26	60	33	39	33
27	60	28	33	33
28	78	28	33	33
29	69	33	33	39
30	78	33	39	33
31	60	......	33	......

Monthly Discharge of Bouquet River at Willsboro, N. Y.
[Drainage area, 270 square miles.]

MONTH.	Discharge in Second-Feet.				Run-off, depth in inches on drainage area.
	Maximum.	Minimum.	Mean.	Per square mile.	
1908.					
August 24-31	78	52	66.9	.248	.07
September	69	23	42.5	.157	.18
October	52½	33	38.5	.143	.16
November	45½	28	34.1	.126	.14

AU SABLE RIVER.

DESCRIPTION.

Au Sable river rises in the Adirondack mountains in the northwestern part of Essex county and flows northeasterly into Lake Champlain near Fort Kent. This stream drains a rugged, mountainous area, nearly all forest covered. Two main branches unite at Au Sable Forks, about 20 miles from the mouth of the stream along river. In this twenty miles a total descent of 460 feet occurs, a portion of which is in the famous Au Sable Chasm.

The east branch of the Au Sable river drains a long, narrow basin, extending northeasterly and southwesterly. There are few lakes, aside from Au Sable Lakes, which are at the head of the stream. Tributaries are numerous.

The west branch of Au Sable river receives the outflow from Lake Placid at elevation 1,864 feet. Numerous smaller lakes feed this branch of the river. Its drainage basin occupies a plateau at a general elevation of 800 to 1,200 feet, the mountainous boundaries of the watershed rising to altitudes of 3,000 to 5,000 feet.

Drainage Areas of Au Sable River. a

LOCATION.	Area.	
	Place to place.	Total.
	Square miles.	*Square miles.*
Lake Placid, water-surface	....	3.8
Lake Placid, drainage area	21.8	21.8
West branch from foot of Lake Placid to junction with East branch	211.2	233.0
East branch above forks	196.9	429.9
Above gaging station	40.1	470.0
Gaging station to Keeseville	6.1	476.1
Keeseville to Birmingham	27.4	503.5
Birmingham to mouth	17.8	521.3

a From Willsboro, Au Sable, Lake Placid, Mount Marcy, and Elizabethtown sheets of the United States Geological Survey topographic atlas.

AU SABLE RIVER AT KEESEVILLE, N. Y.

On August 1, 1904, a temporary low-water station was established on what is known as the old Hatch farm, owned by C. H. Baldwin, about three and one-half miles up the river from Keeseville. It was discontinued September 29, 1904. During that period daily gage heights were read, five discharge measurements made, and a rating curve determined. The station was reëstablished as a temporary station on August 21, 1908, by George M. Bratt, and a staff gage placed at the same location as the previous one. This gage, which was read daily for a short time by Miss Nellie G. Baldwin, was placed near the left bank in a small bay and is referred to the following bench-mark: Four nails driven into root of tree, being the second tree from left bank of river, on the left bank of a ravine about thirty feet from river; elevation 7.77 above zero of gage. From comparison of discharge measurements it appears that the zero of the 1908 gage is about 0.31 feet above the zero of that established in 1904.

The results of gagings made in 1904 are contained in the report of the State Engineer for 1904, pp. 542 and 543.

Mean Daily Gage Height, in Feet, of Au Sable River, near Keeseville, N. Y.

DAY.	Aug.	Sept.
1908.		
1	......	0.8
2	......	.8
3	......	.7
4	......	.7
5	......	......
6	......	.8
7	......	.8
8	......	.7
9	......	.7
10	......	.7
11	......	.7
12	......	.7
13	......	.7
14	......	.7
15	......	.7
16	......	.7
17	......	.7
18	......	.7
19	......	......
20	......	......
21	0.8	......
22	.8	......
23	.9	......
24	.8	......
25	.8	......
26	.8	......
27	......	......
28	.8	......
29	.7	......
30	.7	......
31	.7	......

Current-meter Discharge Measurements of Au Sable River near Keeseville, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Dis-charge.
1908.		*Feet.*	*Square Feet.*	*Feet.*	*Second-feet.*
Aug. 21..	Geo. M. Brett	99	123	0.84	202
Sept. 18...	C. R. Adams	110	96	0.69	172

Rating Table for Au Sable River near Keeseville, N. Y., for 1904 *and* 1908.

GAGE HEIGHT.	Discharge.	GAGE HEIGHT.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*
0.70	173	1.90	870
0.80	194	2.00	1,000
0.90	220	2.10	1,140
1.00	250	2.20	1,290
1.10	285	2.30	1,450
1.20	325	2.40	1,620
1.30	370	2.50	1,800
1.40	420	2.60	1,990
1.50	480	2.70	2,190
1.60	555	2.80	2,390
1.70	645	2.90	2,600
1.80	750		

NOTE. — The above table is not applicable for ice or obstructed channel conditions. It is based on seven discharge measurements made during 1904 and 1908 and is well defined between gage heights .7 feet and 1.9 feet. The table is also applicable to 1904 gage heights, after a correction of —.31 foot has been applied.

Mean Daily Discharge, Second-feet, of Au Sable River near Keeseville, N. Y.

DAY.	Aug.	Sept.
1908.		
1	......	194
2	......	194
3	......	173
4	......	173
5	......	184
6	......	194
7	......	194
8	......	173
9	......	173
10	......	173
11	......	173
12	......	173
13	......	173
14	......	173
15	......	173
16	......	173
17	......	173
18	......	173
19	......	....
20	......	....
21	194	....
22	194	....
23	220	....
24	194	....
25	194	....
26	194	....
27	194	....
28	194	....
29	173	....
30	173	....
31	173	....

SARANAC RIVER.

DESCRIPTION.

Saranac river rises in southeastern Franklin county, and flows northeastward to a point near Cadyville and thence eastward into Lake Champlain at Plattsburg. The southern boundary of the basin is the Ampersand mountain range, and the stream drains the north slope of the most elevated region of the State of New York. About 16.2 per cent of the upper drainage area is water-surface. The areas tributary to the river are shown in the following table:

Drainage Areas of Saranac River. a

LOCATION.	Area.	Total area.
	Square miles.	*Square miles.*
Above Saranac lake State dam	....	157.5
Above Saranac Lake village	44.9	202.4
Above Franklin Falls	104.3	306.7
North branch Saranac river	136.6	136.6
At junction North branch	....	498.8
Above High Falls	19.6	518.4
Above Cadyville	74.6	593.0
Above Kent Falls	2.9	595.9
Above Morrisonville	2.0	597.9
Above Lozier dam	26.1	624.0
Above mouth	5.6	629.6

a From Bien's Atlas of New York.

The results of gagings of Saranac river at a station formerly maintained at Saranac lake are given in the report of the State Engineer and Surveyor for 1903, Supplement, pages 71–74.

In 1854 a timber dam was built below lower Saranac lake for the purpose of flooding logs. In 1899–1901 a masonry dam and lock were erected by the State at this point, raising the water-level of lower Saranac lake, eighteen inches.

SARANAC RIVER NEAR PLATTSBURG, N. Y.

A gaging station was established by Robert E. Horton at the dam of the Plattsburg Light, Heat and Power Company, six miles above Plattsburg, March 17, 1903. This station is maintained by the U. S. Geological Survey in coöperation with this Department.

The record includes the flow over a straight spillway crest 171.25 feet in length, the discharge through two five-foot waste gates

when open, and the discharge through five thirty-three-inch Victor turbines controlled by automatic governors. The gages were read and the record furnished by A. E. Hare until January, 1907; since then the record has been furnished by the company. Experiments have been made at Cornell University hydraulic laboratory on a model of the ogee section of the dam, from which coefficients have been derived for the calculation of the discharge.

Mean Daily Discharge, Second-feet, of Saranac River, near Plattsburg, N. Y.

DAY.	Jan.	F	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1907									
1	418		562	632	337	98	549	362	412
2	687		381	597	403	89	448	177	331
3	627		510	630	190	217	418	281	301
4	613		536	536	126	311	422	402	401
5	807		513	542	271	561	416	335	477
6	852		449	497	333	1,061	393	201	470
7	[illegible]		498	871	369	687	340	969	412
8	711		571	818	383	568	589	939	275
9	[illegible]		370	675	377	509	968	659	556
10	[illegible]		512	475	319	495	707	541	762
11	[illegible]		545	430	143	406	714	454	1,293
12	[illegible]		338	391	192	390	575	358	722
13	[illegible]		330	377	172	419	491	[illegible]	589
14	[illegible]		461	311	227	373	655	322	553
15	417		414	451	365	256	529	310	511
16	[illegible]		198	438	193	391	573	371	560
17	[illegible]		206	377	196	348	469	391	580
18	[illegible]		285	301	87	358	466	409	563
19	[illegible]		336	320	232	227	466	391	531
20	[illegible]		316	224	191	222	336	486	515
21	[illegible]		346	102	224	192	432	460	622
22	[illegible]		565	237	258	102	428	564	596
23	[illegible]		533	218	237	282	412	543	721
24	421		906	366	234	210	309	546	818
25	404		762	439	119	301	255	581	[illegible]
26	[illegible]		774	329	197	403	274	513	892
27	[illegible]		552	336	230	383	309	443	752
28	[illegible]		642	151	246	309	510	554	817
29	[illegible]		614	372	333	146	567	424	[illegible]
30	417		600	393	382	429	488	463	949
31	[illegible]			354	274		390		1,106
Mean	505		491	426	254	358	481	467	656

Mean Daily Discharge, Second-feet, of Saranac River, near Plattsburg, N. Y.

DAY	Jan.	Feb.	Mar[illegible]	[illegible]il.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	941	417	6	20	2,010	1,560	275	205	37	160	61	277
2	855	482	5	20	1,950	1,280	326	128	64	181	196	245
3	895	443	6	70	2,[illegible]	[illegible]30	296	82	222	172	234	203
4	787	377	5	50	2,	20	100	15	201	140	182	166
5	719	358	6	00	2,	50	173	130	216	252	213	123
6	652	430	5	40	1,	64	288	668	89	215	180	77
7	741	380	5	10	1,	75	200	477	256	226	212	262
8	729	397	5	10	3,	20	187	312	175	186	166	176
9	620	365	6	10	2,	50	182	216	175	232	222	247
10	449	450	5	10	1,	10	177	255	138	214	214	250
11	523	405	5	20	1,	15	189	247	138	158	243	212
12	669	407	6	30	1,	93	102	178	153	352	252	250
13	693	394	6	60	2,	91	338	265	123	245	270	240
14	634	390	8	10	2,	59	261	256	196	174	219	289
15	472	498	1,2	90	1,	13	218	201	154	208	161	226
16	620	1,190	1,5	00	1,	73	218	147	144	191	250	257
17	593	1,240	1,0	20	1,	82	222	267	147	192	252	272
18	649	1,070	7	80	1,	77	245	358	149	178	208	207
19	587	883	6	20	1,	47	540	314	145	234	259	187
20	547	805	7	30	1,	37	523	313	72	120	212	171
21	623	770	7	00	1,	43	457	228	206	219	262	306
22	701	795	8	60	1,	12	424	228	158	187	143	236
23	643	819	1,0	70	1,	91	235	96	123	155	322	217
24	561	688	1,4	00	1,	22	235	217	144	145	299	172
25	500	722	1,2	20	1,	79	240	95	152	139	369	145
26	547	605	1,2	50	1,	72	223	187	138	253	420	319
27	591	632	2,3	10	1,	55	265	139	84	180	373	157
28	480	687	2,5	90	1	19	231	145	114	250	352	294
29	483	658	4,6	40	1,	16	235	191	192	205	118	224
30	487		3,4	30	1,	38	224	82	188	230	347	167
31	400		2,580		1,		232	153		208		197
Mean	626	615	1,180	1,930	1,	37	260	219	150	198	240	218

Monthly Discharge of Saranac River near Plattsburg, N. Y.

[Drainage area, 624 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1907					
January	852	253	505	0 808	0 929
February	436	137	322	0 515	0 536
March	4,081	172	939	1 50	1 72
April	2,175	481	981	1 57	1 76
May	2,058	407	1,102	1 76	2 02
June	906	198	491	0 786	0 880
July	871	102	426	0 682	0 784
August	403	87	254	0 406	0 467
September	1,061	89	358	0 573	0 642
October	968	255	481	0 770	0 886
November	969	177	467	0.747	0 837
December	1,293	275	656	1 05	1 21

Monthly Discharge of Saranac River near Plattsburg, N. Y.
[Drainage area 624 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	941	400	626	1.00	1.15
February	1,240	358	615	0.986	1.06
March	4,630	525	1,180	1.89	2.18
April	2,530	1,360	1,930	3.09	3.45
May	3,170	1,320	1,870	3.00	3.46
June	1,560	149	697	1.12	1.25
July	540	100	260	0.417	0.48
August	668	15	219	0.351	0.40
September	256	37	150	0.240	0.27
October	352	120	198	0.317	0.37
November	420	61	240	0.384	0.43
December	319	77	218	0.350	0.40
The year	4,630	15	685	1.10	14.90

BIG CHAZY RIVER.

BIG CHAZY RIVER NEAR MOOERS, N. Y.

A temporary gaging station was established on Big Chazy river at the highway bridge at Thorns Corners between Mooers Forks and Mooers, August 22, 1908. The station is located about two miles from Mooers Forks and one mile from Mooers. It was established by Geo. M. Brett for the U. S. Geological Survey in coöperation with this Department. A 5-ft. enameled steel gage, divided to feet and tenths, was nailed to the down-stream end of the highway bridge pier. The zero mark of the gage is 14.83 ft. below the left-hand, down-stream corner of the top of the pier and 5.18 ft. below a horizontal chisel mark cut on the down-stream face of the pier near the gage. Current-meter measurements are made by wading the stream about 1,200 ft. below the gage and also at about 150 ft. above the gage. Measurements can only be obtained in times of low water. Gage readings are taken each morning and afternoon by T. Vaschow, who resides near the gage.

Mean Daily Gage Height, in Feet, of Big Chazy River at Mooers, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	1.1	1.2	1.25	1.6
2	......	1.1	1.2	1.25	1.3
3	......	1.1	1.2	1.25	1.15
4	......	1.1	1.35	1.2	1.4
5	......	1.1	1.25	1.25	1.35
6	......	1.0	1.3	1.55	1.0
7	......	1.25	1.1	1.25	1.45
8	......	1.15	1.15	1.15	....
9	......	1.15	1.15	1.35	....
10	......	1.15	1.2	1.35	....
11	......	1.3	1.25	1.5	....
12	......	1.1	1.3	1.55	....
13	......	1.0	1.2	1.5	....
14	......	1.2	1.2	1.45	....
15	......	1.05	1.2	1.35	....
16	......	1.15	1.2	1.40	....
17	......	1.15	1.15	1.35	....
18	......	1.15	1.1	1.35	....
19	......	1.15	1.1	1.35	....
20	1.3	1.15	1.2	1.35	....
21	1.3	1.1	1.1	1.3	....
22	1.2	1.1	1.1	1.35	....
23	1.2	1.15	1.2	1.3	....
24	1.2	1.15	1.2	1.4	....
25	1.2	1.15	1.1	1.45	....
26	1.15	1.1	1.15	1.5	....
27	1.25	1.1	1.3	1.5	....
28	1.2	1.1	1.15	1.3	....
29	1.15	1.25	1.3	1.4	....
30	1.0	1.25	1.2	1.3	....
31	1.25	......	1.3	......	....

Current-meter Discharge Measurements of Big Chazy River at Mooers, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
Aug. 20*a*.	Geo. M. Brett	26.0	15.0	1.28	27.6
Sept. 17*a*.	C. R. Adams	29.0	33.9	1.12	17.0
Nov. 9*b*.	C. R. Adams	23.0	65.4	1.37	46.6

a Measurement made by wading.
b Measurement made from the bridge.

OSWEGATCHIE RIVER.

DESCRIPTION.

Oswegatchie river has its source in the region of lakes and timbered swamps in the southern part of St. Lawrence county. The largest of the lakes is Cranberry lake, which affords valuable storage to water-power users on its outlet, East branch of Oswegatchie river. East and west branches flow in a general northwesterly direction and unite near Talcville. From Gouverneur to Oxbow the river flows southwestward; it then turns sharply and flows northeastward to Rensselaer Falls, turns again to the north-

west, receives the outlet of Black lake at Galilee, and finally enters the St. Lawrence at Ogdensburg.

OSWEGATCHIE RIVER NEAR OGDENSBURG, N. Y.

The gaging station was established May 16, 1903, by Robert E. Horton. It is located at Eel weir bridge, just below the junction of Oswegatchie river and Black lake outlet. This gaging station is maintained by the U. S. Geological Survey in coöperation with this Department.

The channel is in rock and is partly artificial, rock underneath the bridge having been removed by blasting to increase the bridge opening. The bridge consists of two spans, the right being 129.6 feet long and the left 130.1 feet.

Discharge measurements are made from the down-stream side of the bridge. The initial point for soundings is the top of the face of the right abutment, down-stream side.

A standard chain gage, which is observed twice daily by Joseph H. La Rue, is attached to the ironwork of the bridge on the up-stream side of the right-hand span. The bench-mark is a square chisel draft on the up-stream side of the right-hand abutment; elevation, 16.72 feet above gage datum.

Mean Daily Gage Height, in Feet, of Oswegatchie River near Ogdensburg, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1903.												
1	8.3	5.4	6.1	9.1	6.5	5.6	5.1	5.1	4.7	4.6	4.4	5.0
2	8.3	5.4	6.0	9.2	6.4	5.5	5.1	5.1	4.7	4.5	4.4	4.7
3	8.2	5.4	5.9	8.9	6.2	5.5	5.0	5.1	4.7	4.5	4.4	4.6
4	8.0	5.3	5.9	8.7	7.0	5.5	5.0	5.1	4.7	4.5	4.4	4.6
5	7.7	5.2	5.9	8.4	7.4	5.4	5.1	5.1	4.7	4.5	4.4	4.7
6	7.6	5.2	5.9	8.1	7.4	5.3	5.0	5.1	4.7	4.5	4.4	4.7
7	7.4	5.1	5.9	7.9	7.5	5.3	5.0	5.0	4.7	4.5	4.4	4.6
8	7.1	5.1	5.8	7.6	7.9	5.3	5.1	5.0	4.7	4.5	4.4	4.6
9	6.7	5.0	5.7	7.5	8.1	5.3	4.9	5 0	4.7	4.5	4.4	4.6
10	6.4	5.0	5.7	7.3	8.3	5.2	4.9	5.0	4.7	4.5	4.4	4.6
11	6.4	4.9	5.7	7.6	8.3	5.1	4.9	5.0	4.7	4.6	4.4	4.6
12	6 2	4.9	5.6	7.5	8.4	5.1	4.9	4.9	4.6	4.5	4.4	4.6
13	6.0	4.9	5.6	7.5	8.3	5.0	4.8	5.0	4.6	4.5	4.4	4.6
14	6.0	5.0	5.9	7.4	8.2	5.0	4.8	4.9	4.6	4.5	4.5	4.6
15	5.8	5 2	6 5	7.3	8.2	5.0	4.8	4.9	4.6	4.5	4.4	4.6
16	5.8	5.7	7.2	7.1	8.1	4.9	4.8	4.8	4.6	4.5	4.4	4.6
17	5.8	5.9	8 2	7.0	7.9	5.0	4.8	4.8	4.6	4.4	4.4	4.6
18	5.8	7.1	8.2	7.0	7.5	5.2	4.8	4.8	4.6	4.4	4.4	4.6
19	5.6	7.2	8.4	6.8	7.4	5.4	4.8	4.8	4.5	4.4	4.5	4.6
20	5.5	7.6	8.3	6.8	7.1	5.5	4.9	4.8	4.5	4.4	4.6	4.6
21	5.4	7.5	8.1	6.6	6.8	5.3	4.9	4.8	4.5	4.4	4.6	4.6
22	5.4	7.4	7.8	6.5	6.8	5.2	5.1	4.8	4.5	4.4	4.6	4.6
23	5.4	7.3	7.8	6.3	6.8	5.3	5.2	4.8	4.5	4.4	4.6	4.6
24	5.6	7.2	7.7	6.1	6.7	5.4	5.2	4.7	4.5	4.4	4.6	4.6
25	5.7	7.0	8 0	6.1	6.7	5.2	5.3	4.7	4.5	4.4	4.6	4.6
26	5.6	6.8	7.8	6.5	6.5	5.2	5.4	4.7	4.5	4.4	4.7	4.6
27	5.6	6.6	8.1	6.0	6.4	5.2	5.4	4.7	4.5	4.4	4.8	4.6
28	5.6	6 4	8.3	6.0	6.1	5.2	5.4	4.7	4.5	4.4	4.7	4.6
29	5.5	6.2	8 6	6.3	6.0	5.2	5.4	4.7	4.6	4.4	4.7	4.6
30	5.5	......	8.8	6.1	5.9	5.2	5.3	4.7	4.6	4.4	4.7	4.6
31	5.5	......	9.0	......	5.8	......	5.2	4.7	......	4.4	......	4.6

Current-meter Discharge Measurements of Oswegatchie River near Ogdensburg, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Square feet.*	*Feet.*	*Second-feet.*
1908.					
Sept. 9...	C. E. Allen........................	213	366	4.82	753

NOTE.— Measurement poor on account of clogging of meter by eel grass.

Rating Table for Oswegatchie River near Ogdensburg, N. Y.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
4.40	590	5.50	2,180	6.60	5,185	8.40	10,570
4.50	680	5.60	2,400	6.70	5,480	8.60	11,180
4.60	780	5.70	2,640	6.80	5,775	8.80	11,790
4.70	890	5.80	2,890	6.90	6,070	9.00	12,400
4.80	1,010	5.90	3,160	7.00	6,365	9.20	13,020
4.90	1,140	6.00	3,440	7.20	6,955	9.40	13,640
5.00	1,280	6.10	3,730	7.40	7,550	9.60	14,260
5.10	1,440	6.20	4,020	7.60	8,150	9.80	14,880
5.20	1,610	6.30	4,310	7.80	8,750	10.00	15,500
5.30	1,790	6.40	4,600	8.00	9,350	......	....
5.40	1,980	6.50	4,890	8.20	9,960	......	....

The above table is applicable only for open channel conditions. It is based upon discharge measurements made during 1903 to 1908. It is fairly well defined.

Mean Daily Discharge, Second-feet, of Oswegatchie River near Ogdensburg, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1................	10,300	1,980	3,730	12,700	4,890	2,400	1,440	1,440	890	780	590	1,280
2................	10,300	1,980	3,440	13,000	4,600	2,180	1,440	1,440	890	680	590	890
3................	9,900	1,980	3,160	12,100	4,020	2,180	1,28	1,440	890	680	590	780
4................	9,350	1,790	3,160	11,500	6,360	2,18	1,28	1,440	890	680	590	780
5................	8,450	1,610	3,16	10,600	7,55	1,98	1,44	1,440	890	680	590	890
6................	8,150	1,610	3,16	9,660	7,55	1,79	1,28	1,440	890	680	590	890
7................	7,550	1,440	3,16	9,050	7,85	1,79	1,28	1,280	890	680	590	780
8................	6,660	1,440	2,89	8,150	9,050	1,79	1,440	1,280	890	680	590	780
9................	5,480	1,280	2,640	7,850	9,66	1,790	1,140	1,280	890	680	590	780
10................	4,600	1,280	2,64	7,250	10,300	1,610	1,140	1,280	890	680	590	780
11................	4,600	1,140	2,64	8,15	10,30	1,440	1,140	1,280	890	780	590	780
12................	4,020	1,140	2,400	7,85	10,600	1,440	1,140	1,140	780	680	590	780
13................	3,440	1,140	2,400	7,850	10,300	1,280	1,010	1,280	780	680	590	780
14................	3,440	1,280	3,160	7,550	9,960	1,280	1,010	1,140	780	680	680	780
15................	2,890	1,610	4,890	7,250	9,960	1,280	1,010	1,140	780	680	590	780
16................	2,890	2,640	6,960	6,660	9,660	1,140	1,010	1,010	780	680	590	780
17................	2,890	3,160	9,960	6,360	9,050	1,280	1,010	1,010	780	590	590	780
18................	2,890	6,660	9,960	6,360	7,850	1,610	1,010	1,010	780	590	590	780
19................	2,400	6,960	10,600	5,780	7,550	1,980	1,010	1,010	680	590	680	780
20................	2,180	8,150	10,300	5,780	6,660	2,180	1,140	1,010	680	590	780	780
21................	1,980	7,850	9,660	5,180	5,780	1,790	1,140	1,010	680	590	780	780
22................	1,980	7,550	8,750	4,890	5,780	1,610	1,440	1,010	680	590	780	780
23................	1,980	7,250	8,750	4,310	5,780	1,790	1,610	1,010	680	590	780	780
24................	2,400	6,960	8,450	3,730	5,480	1,980	1,610	890	680	590	780	780
25................	2,640	6,360	9,350	3,730	5,480	1,610	1,790	890	680	590	780	780
26................	2,400	5,780	8,750	4,890	4,890	1,610	1,980	890	680	590	890	780
27................	2,400	5,180	9,660	3,440	4,600	1,610	1,980	890	680	590	1,010	780
28................	2,400	4,600	10,300	3,440	3,730	1,610	1,980	890	680	590	890	780
29................	2,180	4,020	11,200	4,310	3,440	1,610	1,980	890	780	590	890	780
30................	2,180	......	11,800	3,730	3,160	1,610	1,790	890	780	590	890	780
31................	2,180	......	12,400	......	2,890	......	1,610	890	......	590	......	780

Monthly Discharge of Oswegatchie River near Ogdensburg, N. Y.
[Drainage area, 1,580 square miles.]

MONTH.	Discharge in Second-feet.				Run-off.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.
1908.					
January	10,300	1,989	4,420	2.80	3.23
February	8,150	1,148	3,650	2.31	2.49
March	12,400	2,400	6,560	4.15	4.78
April	13,000	3,440	7,100	4.49	5.01
May	10,600	2,890	6,930	4.39	5.06
June	2,400	1,140	1,710	1.08	1.20
July	1,980	1,010	1,370	.867	1.00
August	1,440	890	1,130	.715	.82
September	890	680	787	.498	.56
October	780	590	643	.407	.47
November	1,010	590	688	.435	.49
December	1,280	780	807	.511	.59
The year	13,000	590	2,980	1.89	25.70

RAQUETTE RIVER.

Description.

Raquette river drains a long, narrow basin extending from northern Hamilton county to St. Lawrence river. Its sources are on an elevated plateau, dotted with mountains interspersed with lakes. The region is timbered, but numerous marsh and swamp areas exist, many of which are on the divide and feed streams flowing in opposite directions. The lakes of the head waters afford ample opportunities for storage development.

Observations at the dam of the Hannawa Falls Power Company were taken from September, 1902, to March 31, 1903. The discharge has not been computed.

The results of gagings at a station formerly maintained on Raquette river at South Colton, N. Y., may be found in the report of the State Engineer and Surveyor for 1904, pages 533–4.

Raquette River at Massena Springs, N. Y.

A gaging station was established by Robert E. Horton at the highway bridge at Massena Springs, September 21, 1903. Observations were continued until October 17, 1903, when the station was temporarily abandoned. It was resumed April 9, 1904, and has since been maintained by the U. S. Geological Survey in coöperation with this Department.

The channel is straight for 300 feet above and 1,000 feet below the bridge, which consists of a single span of 167.5 feet. The banks are not subject to overflow. The current is swift and uniform.

Discharge measurements are made from the down-stream side of the Massena Springs highway bridge. The initial point for soundings is the top of the right bridge abutment on the up-stream side of the bridge.

The gage, which was read during 1908 by G. L. Buffum, consists of a vertical scale attached to the right abutment on the up-stream side of the bridge. The bench-mark is a cross painted on the outside down-stream corner of the foundation adjacent to the sulphur springs; elevation above gage datum, 12.21 feet. The Sunday flow of this stream, like many others in this State, is often held back during the low-water season, while ponds at mills above are being refilled. Where there is extensive pondage of this character, the resultant effect may be shown in the stream for several days.

Mean Daily Gage Height, in Feet, of Raquette River at Massena Springs, N. Y.

DAY.	Jan.	Feb.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.											
1	8.6	5.9	.....	8.0	6.4	3.0	2.1	2.0	1.0	1.3	2.4
2	8.6	5.9	.....	8.6	6.0	2.7	1.5	2.2	1.1	1.4	2.0
3	7.9	5.6	.....	8.6	5.5	2.4	1.7	1.6	1.1	1.4	2.0
4	7.9	5.5	.....	8.6	5.1	2.1	1.8	1.4	1.2	1.0	1.7
5	7.9	5.5	.....	8.7	5.0	2.0	2.0	1.4	1.2	.8	1.5
6	6.9	5.3	8.6	8.9	5.0	4.0	2.0	1.4	1.4	.8	2.0
7	6.9	5.4	7.5	8.9	4.9	3.1	2.0	1.5	1.5	1.0	2.2
8	7.1	5.4	7.5	9.0	4.9	2.5	1.8	1.8	1.5	1.0	2.2
9	7.0	5.2	7.1	9.1	4.5	2.0	1.4	1.9	1.5	1.1	2.5
10	6.4	5.2	6.8	9.1	4.4	2.0	1.9	1.8	1.4	1.1	2.8
11	6.4	5.0	7.6	9.2	4.0	1.6	2.0	1.8	1.2	1.5	2.8
12	6.9	5.0	6.2	9.3	3.9	1.6	1.7	1.8	1.1	1.4	3.1
13	7.0	4.8	7.1	9.3	3.9	2.2	1.7	1.9	1.1	1.4	3.0
14	7.0	5.0	6.9	8.9	4.0	2.0	2.0	1.9	1.3	1.6	2.8
15	6.8	5.0	6.7	8.5	4.6	1.5	2.2	1.4	1.3	1.6	2.8
16	6.8	.....	6.7	8.4	3.9	1.9	1.6	1.3	1.2	1.4	2.7
17	6.8	.....	6.7	8.4	3.0	2.0	2.6	1.3	1.1	1.4	2.2
18	6.9	.....	6.6	8.1	2.9	2.0	2.6	1.2	1.4	1.6	2.4
19	6.9	.....	6.1	8.0	2.9	2.0	2.4	1.0	.9	1.8	2.4
20	6.6	.....	5.9	7.7	2.9	3.1	1.6	.9	1.2	1.8	2.7
21	6.6	.....	5.8	7.5	2.8	3.1	1.6	.7	1.1	1.8	3.0
22	5.4	.....	5.6	7.5	2.8	3.8	1.5	.7	1.1	1.6	3.0
23	5.9	.....	5.6	7.4	2.7	3.5	1.5	.7	1.1	1.7	2.9
24	5.9	.....	5.6	7.2	2.5	3.1	1.9	.7	1.2	2.3	2.7
25	5.9	.....	5.8	6.9	2.5	3.1	2.0	1.5	1.2	2.6	2.6
26	6.0	.....	6.0	6.5	2.3	2.0	2.0	1.5	1.4	2.0	2.6
27	6.0	.....	6.3	6.5	2.3	2.1	1.8	1.4	1.4	2.7	3.0
28	6.1	.....	6.8	6.5	2.7	2.3	1.8	1.1	1.2	2.2	2.9
29	6.0	.....	7.3	6.4	2.9	2.4	1.8	1.1	1.2	1.6	2.9
30	6.0	.....	7.3	6.4	3.0	2.1	1.6	1.0	1.2	2.7	2.9
31	5.9	.....	.....	6.4	.....	2.1	1.8	.....	1.1	.....	2.7

Current-meter Discharge Measurements of Raquette River at Massena Springs, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Dis-charge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
May 13...	D. M. Wood	176	1,640	9.31	8,370
Sept. 8..	C. E. Allen	150	271	1.48	368
Sept. 25..	C. E. Allen	146	270	1.70	380
Oct. 19...	C. R. Adams	141	247	1.33	279

Rating Table for Raquette River at Massena Springs, N. Y., for 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
0.70	105	3.20	1,420	5.60	3,600	7.80	6,320
0.80	130	3.40	1,580	5.80	3,820	8.00	6,600
0.90	155	3.60	1,740	6.00	4,040	8.20	6,880
1.00	185	3.80	1,900	6.20	4,260	8.40	7,160
1.20	250	4.00	2,080	6.40	4,490	8.60	7,450
1.40	325	4.20	2,260	6.60	4,730	8.80	7,750
1.60	405	4.40	2,440	6.80	4,970	9.00	8,050
1.80	500	4.60	2,620	7.00	5,230	9.20	8,350
2.00	605	4.80	2,800	7.20	5,490	9.40	8,650
2.20	720	5.00	3,000	7.40	5,760	9.60	8,960
2.40	845	5.20	3,200	7.60	6,040	9.80	9,280
2.60	980	5.40	3,400	......	....	10.00	9,600
2.80	1,120	......	....	......	....	......	....
3.00	1,270	......	....	......	....	......	....

NOTE.— The above table is not applicable for ice or obstructed channel conditions. It is based on 24 discharge measurements, and is well defined between gage heights 1.0 feet and 10.0 feet.

Mean Daily Discharge, Second-feet, of Raquette River at Massena Springs, N. Y.*

DAY.	Jan.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.						
1	7,45	660	605	185	285	845
2	7,45	365	720	215	325	605
3	6,46	450	405	215	325	605
4	6,46	500	325	250	185	450
5	6,46	605	325	250	130	365
6	5,10	605	325	325	130	450
7	5,10	605	365	365	185	550
8	5,36	500	500	365	185	550
9	5,23	325	550	365	215	720
10	4,4[illegible]	550	500	325	215	910
11		605	500	250	365	720
12		450	500	215	325	910
13		450	550	215	325	845
14		605	550	285	405	720
15		720	325	285	405	720
16		405	285	250	325	660
17		980	285	215	325	405
18		980	250	325	405	500
19		845	185	155	500	500
20		405	155	250	500	660
21		405	105	215	500	845
22		365	105	215	405	845
23		365	105	215	450	780
24		550	105	250	780	660
25		605	365	250	980	605
26		605	365	325	605	605
27		500	325	325	1,050	845
28		500	215	250	720	780
29		500	215	250	405	780
30		405	185	250	1,050	780
31		500		215		660

NOTE.— Discharge during the frozen period based mainly on the discharge of Oswegatchie river at Ogdensburg, when the flow is not affected by ice conditions.
Discharge Jan. 11-31, 1,590 second feet. Discharge April 1-5, 8,000 second feet.
Discharge Dec. 6 to 31 based on a field inspection made Jan. 6, 1909; daily discharge approximate. Ice obstruction during February and March.

Monthly Discharge of Raquette River at Massena Springs, N. Y.
[Drainage area, 1,170 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.
1908.					
January	7,450		3,000	2.56	2.95
February			2,000	1.71	1.84
March			4,000	3.42	3.94
April		3,600	5,360	4.58	5.11
May	8,500	4,490	6,670	5.70	6.57
June	4,490	780	1,990	1.70	1.90
July	2,080	365	902	.771	.89
August	980	325	545	.466	.54
September	720	105	343	.293	.33
October	365	155	260	.222	.26
November	1,050	130	434	.371	.41
December			673	.575	.66
The year	8,500	105	2,180	1.83	25.40

CHATEAUGAY RIVER.

DESCRIPTION.

Chateaugay river rises near the boundary line of Franklin and Clinton counties in northern New York. From the Chateaugay lakes near its head waters, the river flows northerly, uniting with the St. Lawrence about 20 miles north of the international boundary.

CHATEAUGAY RIVER AT CHATEAUGAY, N. Y.

A temporary low-water station was established August 18, 1908, by George M. Brett, about 1,200 feet up-stream from the dam of the Chasm Power Company, which is about three miles by road from Chateaugay. The drainage area at this point is 119 square miles, taken from the Post Route map.

The channel is straight for about 500 feet above and below the gage, with a swift current. Both banks are very steep and never overflow. The bed is of shaly rock mixed with heavy clay; underlain by ledge rock.

Discharge measurements are made during low water by wading at a section about 80 feet above the gage.

A vertical staff gage is placed near the right bank and is read twice daily under the direction of Mr. W. E. Thayer, manager of the Chasm Power Company. It is referred to the following benchmark: Top of nail driven into notch in stump to which gage is attached, some 80 feet down-stream from the only road which comes to the river down the bluff at the head of the Chasm Power Company's pond; elevation 6.68 feet above gage datum.

Mean Daily Gage Height, in Feet, of Chateaugay River at Chateaugay, N. Y.

DAY.	Sept.	Oct.	Nov.	Dec.
1908.				
1	......	1.45	......	1.60
2	......	1.42	......	1.65
3	......	1.38	......	1.35
4	......	1.50	......	1.62
5	......	1.42	1.52	1.50
6	......	1.45	1.55	1.75
7	......	1.40	1.62	1.75
8	......	1.25	1.68	1.65
9	......	1.35	1.55	1.40
10	......	1.45	1.65	1.60
11	......	1.30	1.78	1.60
12	......	1.55	1.65	1.50
13	......	1.55	1.65	....
14	......	1.20	1.62	....
15	......	1.60	1.65	....
16	......	1.78	1.65	....
17	......	1.72	1.65	....
18	......	1.42	1.65	....
19	......	1.68	1.62	....
20	......	1.65	1.65	....
21	1.62	1.68	1.55	....
22	1.45	1.60	1.65	....
23	1.45	1.58	1.65	....
24	1.62	1.62	1.65	....
25	1.45	1.40	1.65	....
26	1.38	1.72	1.62	....
27	1.32	1.68	1.58	....
28	1.35	1.72	1.65	....
29	1.48	1.60	1.58	....
30	1.50	......	1.65	....
31	......	......	......	....

Current-meter Discharge Measurements of Chateaugay River at Chateaugay, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
Aug. 18a	Geo. M. Brett	57	62.0	1.68	112
Aug. 19a	Geo. M. Brett	54	50.7	1.48	73.9
Sept. 16b	C. R. Adams	48	64.3	1.63	116
Nov. 8a	C. R. Adams	52	35.9	1.20	37.5

a Measurement made by wading. *b* Measurement made from bridge.

GRASSE RIVER.

GRASSE RIVER AT CHASE MILLS, N. Y.

Grasse river drains a long, narrow watershed lying intermediate between Oswegatchie and Raquette rivers. The channel of Grasse river its parallel to St. Lawrence river throughout the lower 18 miles of its course. For several miles of this distance it is separated from the St. Lawrence by a neck of land not exceeding four miles in width. Within this distance occurs the Long Sault rapids of St. Lawrence river, comprising a fall of 45 to 50 feet. This fact has been taken advantage of for the construction of a great

hydraulic power plant by the St. Lawrence Power Company. A canal three and one-half miles in length has been cut across the divide opposite Massena, by which water is diverted from near the head of Long Sault rapids to a power plant situated on the bank of Grasse river. Thirty-five thousand horse-power is developed, under a head of forty-two feet. The spent water is turned into Grasse river, which is used as a tail-race.*

Owing to its lack of storage, water-power on Grasse river is of less importance than on its neighboring streams, Oswegatchie and Raquette rivers. At Chase Mills a power exists, giving a fall of eight feet, which, it is stated, could be increased to thirty feet by the construction of a suitable dam which would back the water to the head of Chamberlain rapids some distance up-stream. Below Russell an undeveloped power exists, where, it is stated, a fall of twenty-five feet could be obtained.

Grasse river has a drainage area above Canton of 113 square miles, and of 637 square miles above its mouth. The stated high-water marks at Chase Mills indicate a maximum discharge of 4,700 second-feet in the spring of 1897. The drainage areas of other streams tributary to St. Lawrence river are given below:

STREAM.	Square miles
West branch St. Regis river above junction of branches	280
East branch St. Regis river above junction of branches	347
St. Regis river below junction of two branches	627
Deer river above junction with St. Regis river	212
St. Regis river above mouth	910
Little Salmon river above junction with Salmon river	103
Salmon river above Malone	179
Salmon river above Little Salmon river	273
Salmon river above junction with Little Salmon river	452
Salmon river above mouth	480
Trout river above New York State line	129
Chateaugay river above New York State line	199

* Full descriptions are given in Engineering News, Feb. 21, 1901, pp. 130–132, and in a pamphlet "The St. Lawrence Power Company of Massena, N. Y.," issued by the company.

Current-meter Discharge Measurement of Grasse River at Chase Mills, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height to water-surface.[a]	Discharge.
		Feet.	*Square feet.*	*Feet.*	*Second-feet.*
1908. Sept. 8	C. E. Allen	213	229	22.4	194

[a] Reference point is a small crow's-foot at middle of highest part, up-stream edge of up-stream spandrel of bridge. Initial point of soundings is up-stream face of left abutment.

LAKE ONTARIO DRAINAGE.

GENERAL FEATURES.

In the northwestern part of the state of New York, between Niagara and St. Lawrence rivers, is an area aggregating about 12,400 square miles drained by streams which flow into Lake Ontario. The divide which controls this drainage is very irregular. Extending to the south and southeast from Fort Niagara, it passes around the head waters of the Genesee a short distance into Pennsylvania; thence reëntering New York it runs southward and eastward from the interior group of lakes, turns to the north, encircles the sources of Black river, turns again to the west, and descends to the lake. The country thus included is level or gently undulating in the counties bordering the lake, but farther south it becomes more rolling, and a series of ridges, gradually increasing in height, stretch down between Cayuga and Seneca, and their companion lakes, finally becoming merged with the elevated, broken country forming the principal divide, the abrupt slopes of which attain altitudes of from 2,000 to 2,500 feet about the head waters of the Genesee.

The easterly, or Black river lobe of the drainage basin receives the run-off from the southwestern slope of the Adirondack mountains — largely a rugged and forest-covered area — receiving heavy precipitation, especially in the winter.

Drift deposits are generally scattered over the section, and the soil is in part derived from that source and in part from the disintegration of native rocks.

The principal streams of the area are the Oswego, formed by the union of Seneca and Oneida rivers, which drain the chain of lakes in central New York, the Genesee, Salmon and Black rivers.

BLACK RIVER DRAINAGE BASIN.

BLACK RIVER.

DESCRIPTION.

Black river rises in the western part of Hamilton county, N. Y., flows southwestward across Herkimer county into Oneida county, turns near Forestport and runs somewhat west of north through Lewis county to eastern Jefferson county, and then flows

westward to Black River bay, at the eastern extremity of Lake Ontario. The upper part of the basin is very rugged and mountainous and contains a large number of lakes.

The regimen of the river is controlled by storage on its upper tributaries, including Beaver river at Beaver, a series of reservoirs at the head waters of Moose river, and additional reservoirs at Forestport and on the head waters of the main river.

Water is diverted from Black river through Forestport feeder to supply the Black River canal at Boonville. A portion of this diverted water flows northward from Boonville and enters Black river again at Lyons Falls; the remainder flows southward through the Black River canal and enters the Erie canal at Rome.

The results of gagings of this division may be found in the State Engineer's report for 1906, Supplement, page 36, and also on pages 597–598 of this report.

The results of gagings at a station formerly maintained on the Black river at Huntingtonville, N. Y., may be found in the report of the State Engineer and Surveyor for 1902, Supplement, pages 31–37.

BLACK RIVER NEAR FELTS MILLS, N. Y.

This station was established by Robert E. Horton, August 29, 1902, and has since been maintained by the U. S. Geological Survey in coöperation with this Department. It is located at the dam of the Harmon Paper Company, formerly owned by the Black River Traction Company, near the village of Felts Mills. The dam is nine miles up-stream from Watertown and seven miles up-stream from the old Huntingtonville gaging station on this stream. The drainage area is estimated at 1,851 square miles, or 37.5 square miles less than at Huntingtonville. The intervening area is mainly drained by two small streams, Townsend and Rutland Hollow creeks.

The dam is of sawed timber, rests on limestone foundation, and is very nearly water-tight. It has a slope on the up-stream face of 2.88 horizontal to 1 vertical. The crest is protected by boiler plate and the down-stream face is vertical, giving a free overfall. The main crest is 380.6 feet long. There are two additional sections on the right-hand side, one 14.1 feet long and the other 17.9

feet. A similarly constructed dam, 117 feet long, at the left bank serves as an auxiliary spillway and as a head-race wall.

The gage, which was read twice daily during 1906, at 7 a. m. and 6 p. m., is attached vertically to a crib on the left-hand side of the stream above the mill. Correction is made to the gage readings for velocity of approach during high water. The discharge over the spillways has been calculated by means of the weir formula, using coefficients derived from experiments of the United States Geological Survey for a dam of similar cross-section.

A wood pulp mill has been constructed adjacent to this dam and was in operation during 1907. The mill contains four 72-inch and one 45-inch Smith-McCormick turbines. A record is kept of the hours run, and gate opening of each wheel, as well as of the head under which they operate.

The results obtained at this station in previous years may be found in the report of the State Engineer and Surveyor for 1906, Supplement, pages 36–40; 1907, page 381.

The dam and spillway having been somewhat injured during high water, repairs were made in the low-water season of 1908. Careful profiles of the crest were obtained before and after repairing and the results used for computing the discharges for the year. Current-meter measurements were also made to determine the relation between the rating tables used for the turbines and the actual discharge. The results are given in the accompanying table. The differences are due in part to the frequent changes in the turbine operation made during low water, to accommodate the operation of the wheels to the flow of the stream.

Current-meter Discharge Measurements of Head Race of Harmon Paper Co., Fells Mills, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet per second.*	*Second-feet.*
Aug. 8....	Weeks & Jones	588.75	524	1.77	927
Sept. 7....	Newton & Weeks	588.87	554	1.58	875
Sept. 8....	Weeks & Patchke	588.83	445	1.79	796

Mean Daily Discharge, Second-feet, of Black River, near Felts Mills, N. Y.

DAY.	aJan	aFeb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov	†Dec.
1908.												
1			*2,769	[illegible]	12,835	3,310	1,263	1,096	884	1 245	*1 062	1,908
2			3,272	[illegible]	12,589	3,310	1,268	*683	839	1,276	1,152	1,686
3			3,813	[illegible]	*12 044	3,082	863	1,336	808	1,208	1 158	1,657
4			3,034	[illegible]	12,8 4	2,413	502	1,097	791	*993	1,158	1,552
5			3,344	[illegible]	11,105	2,461	*658	1,054	916	1,739	1,128	1,125
6			3,687	[illegible]	9,612	2,397	912	964	*450	1,258	1,695	*1,180
7			3,235	[illegible]	8,585	*1,887	1,165	997	1,157	1,255	1,060	2 011
8			*2,504	[illegible]	7,931	2 111	1,607	1,127	862	1,128	*714	2 212
9			3,922	[illegible]	8,333	2,041	1,617	*602	803	1,158	1 806	1,932
10			2,996	[illegible]	*8,915	1 99[illegible]	1 679	1,340	902	1 060	1,169	1,663
11			3 139	[illegible]	12,375	1,657	1,626	1,194	851	*445	1,307	1,733
12			3,105	*1 [illegible]	8,740	1,417	*741	1 133	763	1,508	1,534	1,812
13			3 493	[illegible]	7,805	1,385	1 268	1,054	*384	1,367	1 513	*1,723
14			4,437	[illegible]	7,060	*699	1 058	1,315	792	1,367	1,616	1,511
15			*6,692	8,991	6,712	2 293	935	1,309	853	1,276	*1 320	1 632
16			9,209	8,189	6,658	3 253	1,017	*933	721	1 049	1,371	1,208
17			8 773	7,991	*6,496	2,817	961	1,495	746	1,024	1,617	1,693
18			7,991	7,890	[illegible]	2,413	1,187	1,194	705	*998	1,438	2,128
19			7,783	*6 692	[illegible]	2 091	*2,168	1 103	621	1,545	1,398	1,773
20			7,621	7,805	[illegible]	1,855	3,431	1,054	*353	869	1,337	*871
21			6,832	7,432	[illegible]	*2 504	2,837	1,073	716	942	1,097	1,302
22			*5 751	7 060	[illegible]	3,413	2,949	887	814	839	*1,125	1,048
23			5,949	6,537	[illegible]	2 262	3,353	*723	788	870	1,337	1,338
24			5 861	6,363	[illegible]	2,509	2,204	753	750	733	1,438	610
25			7,296	6,659	[illegible]	2,606	1,901	668	676	*414	1,337	*171
26			7 060	*6 692	[illegible]	2 461	*845	610	647	1,088	2 075	996
27			8 041	8,585	[illegible]	1,776	1,431	655	*323	878	2,462	*890
28			6 627	9 822	[illegible]	*1 287	733	507	806	865	2,893	1,004
29			*15 155	11,381	[illegible]	2,674	1,224	756	922	1,097	*2,050	1,442
30			15 532	11,820	[illegible]	1,393	1 038	*1,312	1,144	1,128	2,318	1 931
31			15 491		[illegible]		850	1 005		1,292		1,483
Mean			6,283	8,807	6,903	2,259	1,461	1,001	760	1,095	1,474	1,467

* Sundays and holidays. † A little ice obstruction. a Ice obstruction.

Monthly Discharge of Black River near Felts Mills, N. Y.
[Drainage area, 1,851 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
March	15,532	2,504	6,283	3 39	3 90
April	12,806	6,363	8,807	4 76	5 33
May	12,844	2,001	6,903	3 73	4 29
June	3,413	699	2,259	1 22	1 37
July	3,431	502	1,461	0 789	0 907
August	1,498	507	1,001	0 540	0 621
September	1,157	323	760	0 410	0 459
October	1,739	414	1,095	0 591	0 680
November	2,893	714	1,474	0 796	0 892
December	2,212	171	1,467	0.793	0 912

MOOSE RIVER.

DESCRIPTION.

Moose river is tributary to Black river at Lyons Falls, N. Y. Its drainage basin lies chiefly in Herkimer and Hamilton counties and comprises a wild, rugged, and uninhabited region, largely

forest-covered, but containing also extensive tracts of cut and burned-over lands. The flow of the stream is more or less regulated by lumbermen's dams, the storage of which is utilized for floating logs.

MOOSE RIVER AT MOOSE RIVER, N. Y.

A gaging station was established June 5, 1900, at Moose River village by Robert E. Horton, and has since been maintained by the U. S. Geological Survey in coöperation with this Department.

The stream is smooth above the gaging station to the foot of McKeever dam, two miles up-stream, but a short distance above the gage it is divided by an island, which creates an ice jam during winter and spring freshets. A short distance below the station a fall occurs. The bed of the stream is of cobble with occasional boulders, the current is smooth, and the depth is fairly uniform. The stream freezes over in winter, alternate layers of ice and snow or slush often forming in such a manner as to prevent discharge measurements being made.

A cableway, having a clear span of 269 feet, was erected in June, 1903, from which current-meter measurements have since been made. The initial point for soundings is the left support of the cable.

The gage, which is read twice daily by Chris Hannan, consists of a graduated board scale, attached to posts on the left bank of the stream, and comprises a high-water and a low-water section. During the ice season the gage is read once each week. The gage was carried out by an ice freshet in February, 1903, and was replaced at a slightly different elevation. The bench-mark is on the top of a boulder on the left bank, 300 feet up-stream from the cableway. Its elevation above the gage zero, prior to February 28, 1903, was 15.36 feet; after February 28, 1903, 15.53 feet.

Mean Daily Gage Height, in Feet, of Moose River at Moose River, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	3.75	2.55	......	4.3	6.35	2.3	0.8	1.1	1.1	1.5	0.9	1.4
2	3.6	2.55	......	4.1	6.2	2.25	0.8	1.2	1.0	1.4	0.9	1.3
3	3.55	2.45	......	3.8	6.0	2.1	0.95	1.2	0.9	1.3	0.9	1.4
4	3.65	2.35	......	3.6	5.7	2.0	0.9	1.3	0.9	1.2	0.95	1.5
5	3.55	2.2	......	3.6	5.3	1.9	1.1	1.2	1.0	1.1	1.0	1.6
6	3.25	2.05	......	3.4	4.85	1.75	1.4	1.2	1.1	1.0	0.9	1.5
7	3.1	2.15	......	3.55	4.35	1.55	1.8	1.1	1.1	0.9	0.75	1.35
8	2.9	2.15	......	4.15	4.3	1.5	1.65	1.1	1.1	0.45	0.7	1.2
9	2.75	2.15	......	5.35	4.95	1.4	1.6	1.0	1.0	0.2	0.7	1.1
10	2.5	2.15	......	5.3	4.5	1.3	1.45	1.0	1.0	0.45	0.2	1.2
11	2.35	2.05	......	5.25	4.0	1.2	1.2	0.9	1.0	0.7	0.8	1.3
12	2.25	......	......	5.2	4.2	1.1	1.05	1.0	1.0	0.8	1.5	1.1
13	2.1	......	......	4.95	4.6	1.05	0.9	1.1	1.0	0.9	1.45	1.25
14	2.15	......	......	4.3	4.55	2.2	0.9	1.2	1.1	0.8	1.2	1.5
15	2.15	......	......	4.4	4.3	2.0	0.9	1.1	0.9	0.8	1.05	1.4
16	2.05	......	......	4.4	4.0	2.2	0.8	1.1	0.85	0.9	0.8	1.15
17	2.05	......	......	4.55	3.85	2.2	0.9	1.0	0.8	0.9	0.7	1.2
18	2.05	......	......	4.85	3.75	2.1	1.0	1.0	0.8	1.0	0.7	1.1
19	2.05	......	......	4.75	3.45	2.0	1.1	0.9	0.9	1.0	0.7	1.1
20	1.95	......	......	4.45	3.2	1.85	1.1	0.9	1.0	0.9	0.6	1.0
21	1.95	......	......	4.2	3.0	1.65	1.0	0.8	1.0	0.9	0.75	1.05
22	1.95	......	......	4.2	2.95	1.45	1.0	0.9	1.0	0.8	0.8	1.1
23	1.85	......	......	4.3	3.15	1.2	1.0	0.9	0.9	0.8	0.9	1.1
24	1.85	......	......	5.15	2.9	1.2	0.9	0.95	0.9	0.7	0.9	1.0
25	1.85	......	......	6.0	2.6	1.35	0.9	1.0	0.9	0.7	1.0	0.9
26	1.85	......	......	6.7	2.45	1.55	0.9	1.0	0.8	0.7	1.9	0.8
27	1.95	......	......	7.05	2.35	1.6	1.0	0.9	0.8	0.7	2.25	1.05
28	1.95	......	......	7.2	2.3	1.4	1.1	0.9	0.8	0.8	2.2	1.25
29	1.95	......	5.15	6.2	2.2	1.25	1.1	0.8	1.1	0.8	1.95	1.1
30	2.25	......	4.85	6.6	2.1	0.95	1.05	0.9	1.35	0.9	1.6	1.0
31	2.55	......	4.6	......	2.2	......	1.0	1.0	......	1.0	......	0.9

NOTE. — Discharge probably affected by ice conditions from Jan. 30 to March 28 and Dec. 4 to 31.

Current-meter Discharge Measurements of Moose River at Moose River, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
May 11	D. M. Wood	226	1,090	4.03	1,970
Sept. 2	C. E. Allen	214	432	1.04	310
Oct. 31	C. R. Adams	212	441	1.00	297

Rating Table for Moose River at Moose River, N. Y., for 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
0.20	140	2.00	610	3.80	1,760	5.60	3,790
0.30	155	2.10	650	3.90	1,850	5.70	3,930
0.40	170	2.20	700	4.00	1,940	5.80	4,070
0.50	190	2.30	750	4.10	2,040	5.90	4,210
0.60	210	2.40	800	4.20	2,140	6.00	4,360
0.70	230	2.50	855	4.30	2,240	6.10	4,510
0.80	250	2.60	910	4.40	2,340	6.20	4,660
0.90	275	2.70	965	4.50	2,450	6.30	4,810
1.00	300	2.80	1,025	4.60	2,560	6.40	4,960
1.10	325	2.90	1,085	4.70	2,670	6.50	5,110
1.20	350	3.00	1,150	4.80	2,780	6.60	5,260
1.30	375	3.10	1,220	4.90	2,900	6.70	5,420
1.40	405	3.20	1,290	5.00	3,020	6.80	5,580
1.50	435	3.30	1,360	5.10	3,140	6.90	5,740
1.60	465	3.40	1,430	5.20	3,260	7.00	5,900
1.70	500	3.50	1,510	5.30	3,390	7.10	6,060
1.80	535	3.60	1,590	5.40	3,520	7.20	6,220
1.90	570	3.70	1,670	5.50	3,650	......	....

NOTE.— The above table is not applicable for ice or obstructed channel conditions. It is based on 4 discharge measurements made during 1907-8 and the form of the 1906 curve, and is well defined between gage heights 0.8 feet and 5.5 feet.

Mean Daily Discharge, Second-feet, of Moose River at Moose River, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1,720	......	......	2,140	4,880	750	250	325	325	435	275	405
2	1,590	......	......	2,040	4,660	725	250	350	300	405	275	375
3	1,550	......	......	1,760	4,360	650	288	350	275	375	275	405
4	1,620	......	......	1,590	3,930	610	275	375	275	350	288	......
5	1,550	......	......	1,590	3,390	570	325	350	300	325	300	......
6	1,320	......	......	1,430	2,840	518	405	350	325	300	275	......
7	1,220	......	......	1,550	2,290	450	535	325	325	275	240	......
8	1,080	......	......	2,090	2,240	435	482	325	325	180	230	......
9	995	......	......	3,460	2,960	405	465	300	300	140	230	......
10	855	......	......	3,390	2,450	375	420	200	300	180	140	......
11	775	......	......	3,320	1,940	350	350	275	300	230	250	......
12	725	......	......	3,260	2,140	325	312	300	300	250	435	......
13	650	......	......	2,960	2,560	312	275	325	300	275	420	......
14	675	......	......	2,240	2,500	700	275	350	300	250	350	......
15	675	......	......	2,340	2,240	610	275	325	275	250	312	......
16	630	......	......	2,340	1,940	700	250	325	262	275	250	......
17	620	......	......	2,500	1,800	700	275	300	250	275	230	......
18	630	......	......	2,840	1,720	650	300	300	250	300	230	......
19	670	......	......	2,720	1,470	610	325	275	275	300	230	......
20	590	......	......	2,400	1,290	552	325	275	300	275	210	......
21	570	......	......	2,140	1,150	482	300	250	300	275	240	......
22	590	......	......	2,140	1,120	420	300	275	300	250	250	......
23	552	......	......	2,240	1,260	350	300	275	275	250	275	......
24	552	......	......	3,200	1,080	350	275	288	275	230	275	......
25	552	......	......	4,360	910	390	275	300	275	230	300	......
26	552	......	......	5,420	828	450	275	300	250	230	570	......
27	590	......	......	5,980	775	465	300	275	250	220	725	......
28	590	......	......	6,220	750	405	325	275	250	250	700	......
29	590	......	3,200	4,660	700	362	325	250	325	250	590	......
30	......	......	2,840	5,260	650	288	312	275	390	275	465	......
31	......	......	2,560	......	700	......	300	300	......	300	......	......

Monthly Discharge of Moose River at Moose River, N. Y.

[Drainage area, 346 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	
1908.						
January	1,720	552	851	2.46	2.83	B
February	....	....	834	2.41	2.60	D
March	....	....	1,500	4.34	5.00	D
April	6,220	1,430	2,990	8.64	9.64	B
May	4,880	650	2,050	5.92	6.82	B
June	750	288	499	1.44	1.61	B
July	535	250	321	.928	1.07	B
August	375	250	305	.882	1.02	B
September	390	250	292	.844	.94	B
October	435	140	271	.783	.90	B
November	725	140	328	.948	1.06	B
December	....	....	303	.876	1.01	D
The year	6,220	140	879	2.54	3.451	....

NOTE.— Discharge during frozen periods based mainly on the discharge of Oswegatchie river at Ogdensburg, where the flow is not affected by ice conditions.

Discharge Jan. 30-31, 560 second-feet; Discharge Feb. 1-15, 400 second-feet; Discharge Feb. 16-29, 1,300 second-feet: Discharge March 1-28, 1,350 second-feet; Discharge Dec. 4-31, 293 second-feet.

SALMON RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Salmon river rises in the southwestern part of Lewis county, N. Y., flows first southward then northwestward, and enters Lake Ontario near Port Ontario. The basin above the gaging station is rolling and very sandy, rock lying near the surface in the upper part of the watershed, where there are also extensive tracts of original forest. The region is subject to heavy falls of snow, which sometimes accumulates in the forest areas to a depth of several feet.

Drainage Areas Tributary to Salmon River. a

LOCALITY.	AREA IN SQUARE MILES.		
	Place to place.	Sub-total.	Total.
Salmon river above Osceola	44.04	....	44.04
Salmon river, Osceola to junction of north branch	26.03	....	70.07
North branch, Salmon river, above Mill creek	83.05	....	....
Mill creek	14.25	97.30	....
North branch, Salmon river, junction of Mill creek to mouth	2.35	99.65	169.72
Salmon river, junction of north branch to Salmon Falls	23.70	....	193.42
Salmon river, Salmon Falls to junction of Beaver Dam brook	6.05	....	199.47
Beaver Dam Brook	15.44	....	214.47
Salmon river, Beaver Dam brook to Sandbank	1.03	....	215.94
Salmon river, Sandbank to Orwell brook	1.28	....	217.22
Orwell brook	23.13	....	240.35
Salmon river, Orwell brook to Trout brook	2.10	....	242.45
Trout brook	14.40	....	256.85
Salmon river, Trout brook to Fox bridge	1.92	....	258.77
Salmon river, Fox bridge to Pulaski	7.49	....	266.26
Salmon river, Pulaski to mouth	5.90	....	272.16

a From United States Geological Survey topographic maps.

SALMON RIVER NEAR PULASKI, N. Y.

The gaging station was established by Robert E. Horton, September 5, 1900. It is located at Fox bridge, near Pulaski, N. Y.[a]

The stream bed is of gravel and cobble, relatively flat and shallow. The bridge consists of two spans, 183.5 feet between abutments. There are two small overflow channels and a flood plain.

Current-meter measurements are made at 5-foot intervals across the stream from the down-stream side of the bridge. The initial point for soundings is the face of the abutment at the right end of the bridge on the down-stream side.

The original gage was a vertical board scale attached to the upstream end of the center pier, having its zero mark 11.59 feet below the bench-mark, which was the top of the capstone of the central pier, up-stream end. This gage was carried away by ice in the winter of 1901–2, and was replaced July 23, 1902, by a standard weight-and-chain gage, having its datum at elevation 12.79 feet below the bench-mark. The gage readings are taken twice each day by S. J. Fox, and have been continued throughout summer and winter, the winter readings being obtained by observing the height to which the water rises in a hole in the ice. Owing to the obstruction of the river channel by ice, the discharge for the winter period has not been estimated. This gaging station was maintained January 1 to June 30, 1907, by the U. S. Geological Survey in coöperation with this Department.

a The location of the gaging station is shown on the Pulaski topographic altas sheet of the United States Geological Survey.

Mean Daily Gage Height, in Feet, of Salmon River near Pulaski, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	2.45	2.72	2.70	3.18
2	......	2.45	2.62	2.70	3.22
3	......	2.45	2.58	2.62	3.15
4	......	2.50	2.50	2.70	3.05
5	......	2.52	2.50	2.75	3.00
6	......	2.60	2.50	2.80	2.85
7	......	2.60	2.45	2.85	3.00
8	......	2.60	2.45	2.90	....
9	......	2.55	2.45	3.02	....
10	......	2.45	2.45	3.25	....
11	......	2.45	2.55	3.52	....
12	......	2.45	2.62	3.72	....
13	......	2.45	2.70	3.62	....
14	......	2.45	2.65	3.25	....
15	......	2.45	2.62	3.10	....
16	2.68	2.45	2.60	3.05	....
17	2.75	2.40	2.50	3.05	....
18	2.80	2.40	......	3.00	....
19	2.78	2.40	......	3.00	....
20	2.75	......	......	3.05	....
21	2.70	......	......	3.08	....
22	2.62	......	......	3.05	....
23	2.60	......	......	3.08	....
24	2.58	......	......	3.08	....
25	2.58	......	......	3.48	....
26	2.50	......	......	4.15	....
27	2.50	2.35	......	4.25	....
28	2.45	2.35	......	3.70	....
29	2.45	2.82	......	3.45	....
30	2.50	3.02	......	3.32	....
31	2.50	......	......	......	....

Current-meter Discharge Measurement of Salmon River near Pulaski, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Dis-charge.
		Feet.	*Square feet.*	*Feet.*	*Second-feet.*
1908. Oct. 17...	C. R. Adams......................	164	212	2.52	125

Rating Table for Salmon River near Pulaski, N. Y., for 1906 *to* 1908. *a*

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
2.20	46	3.70	865	5.20	3,020	6.70	7,750
2.30	67	3.80	965	5.30	3,240	6.80	8,190
2.40	93	3.90	1,060	5.40	3,460	6.90	8,620
2.50	124	4.00	1,170	5.50	3,700	7.00	9,070
2.60	161	4.10	1,300	5.60	3,950	7.10	9,540
2.70	204	4.20	1,420	5.70	4,200	7.20	10,000
2.80	253	4.30	1,550	5.80	4,490	7.30	10,500
2.90	307	4.40	1,680	5.90	4,780	7.40	11,000
3.00	364	4.50	1,830	6.00	5,100	7.50	11,520
3.10	422	4.60	1,980	6.10	5,430	7.60	12,060
3.20	480	4.70	2,140	6.20	5,770	7.70	12,600
3.30	550	4.80	2,300	6.30	6,150		
3.40	620	4.90	2,470	6.40	6,530		
3.50	697	5.00	2,640	6.50	6,930		
3.60	781	5.10	2,840	6.60	7,340		

a Applicable only for ice-free channel.

Mean Daily Discharge, Second-feet, of Salmon River near Pulaski, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	108	214	204	468
2	......	108	170	204	494
3	......	108	154	170	451
4	......	124	124	204	393
5	......	131	124	228	364
6	......	161	124	253	280
7	......	161	108	280	364
8	......	161	108	307	....
9	......	142	108	376	....
10	......	108	108	515	....
11	......	108	142	714	....
12	......	108	170	875	....
13	......	108	204	798	....
14	......	108	182	515	....
15	......	108	170	422	....
16	195	108	161	393	....
17	228	93	124	393	....
18	253	93	161	364	....
19	243	93	161	364	....
20	228	93	161	393	....
21	204	93	161	410	....
22	170	93	161	393	....
23	161	80	161	410	....
24	154	80	161	410	....
25	154	80	161	682	....
26	124	80	161	1,360	....
27	124	80	161	1,480	....
28	108	80	161	865	....
29	108	264	161	658	....
30	124	376	161	564	....
31	124	......	161	......	....

NOTE.— Discharge estimated, Sept. 20-26 and Oct. 18-31.

Monthly Discharge of Salmon River near Pulaski, N. Y.
[Drainage area, 259 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.
1908.					
August 16-31	253	108	169	.653	.32
September	376	80	121	.467	.52
October	214	108	153	.591	.68
November	1,480	170	507	1.96	2.19
December 1-7	494	280	402	1.55	.40

GENESEE RIVER DRAINAGE BASIN.

GENESEE RIVER.

DESCRIPTION.

Genesee river rises in Potter county, Pa., eight or ten miles south of the New York-Pennsylvania boundary, flows northwestward for about thirty-two miles by general course, then turns to the northeast, and empties into Lake Ontario, seven miles north of Rochester. The entire length of the stream, following bends, is about 135 miles, and the drainage area is about 2,450 square miles.

In the northern counties the surface is rolling, with long, easy slopes, except along the streams, which usually lie in deep ravines, hemmed in by steep banks. On the whole there is a gradual rise away from the lakes, and in the upper half of the basin the country becomes rough and is broken by ridges, the summits of which attain elevations of from 2,000 to 2,500 feet above tide.

In the thirty-nine miles between Belmont, in central Allegany county, and Portage, in southwestern Livingston county, the fall of the water-surface is 253 feet, an average of 6.4 feet per mile. At Portage the river plunges down in three magnificent falls, and thence nearly to Mount Morris flows at the bottom of a deep gorge. From Mount Morris to Rochester the valley is broad and open and the stream is bordered by meadows subject to occasional overflow. At Rochester there is another abrupt descent over three heavy falls, amounting to about 260 feet within the city.

The series of remarkable lakes tributary to the Oswego basin is continued westward into the basin of the Genesee and includes Conesus, Hemlock, Canadice, and Honeoye lakes. These lakes serve as natural reservoirs and have inlets draining considerable areas at their upper ends. The slopes adjacent to the lakes themselves are narrow and steep and are drained by gulleys and torrential brooks. The area below the lakes is rolling and the soil is rich and extensively cultivated. The areas and elevations of these lakes are shown in the following table:

Areas and Elevations of Lakes in Genesee River Basin. a

LAKE.	Elevation.	Water-surface area.	Drainage area.	Per cent water-surface.
	Feet.	*Square miles.*	*Square miles.*	
Hemlock lake	896	2.8	46.8	6.12
Canadice lake	1,092	.7	12.6	5.57
Honeoye lake	800	2.5	39.6	6.41

a These lake basins are shown on the Honeoye, Canandaigua, Naples and Wayland topographic atlas sheets of the United States Geological Survey, from which the areas have been taken, with the exception of those for Hemlock and Canadice lakes, which are from surveys of Rochester water-works.

Above all the private dams at Rochester the State formerly maintained a dam for diverting water to the Erie canal, and in the basin of Black creek, one of the upper tributaries of the Genesee from the west, are two reservoirs (Rockville and Cuba reservoirs), owned by the State, also used for the benefit of the Erie canal.

Cuba reservoir, on the Genesee-Allegheny divide, receives the drainage from a tributary area of 26.6 square miles. The storage volume is 454,000,000 cubic feet. The overflow from this reservoir enters Allegheny river. The storage water may be turned into the summit level of the abandoned Genesee Valley canal and thence into Genesee river.

Drainage Areas of Tributaries of Genesee River. a

NAME OF STREAM.	AREA IN SQUARE MILES.		
	Tributary.	GENESEE RIVER. Above tributary.	GENESEE RIVER. Below tributary.
Cryder creek	43.3	99.9	143.2
Chenunda creek	30.0	181.0	210.0
Dyke's creek	68.3	214.0	282.3
Vandemark creek	21.6	301.3	322.9
Knight's creek	22.3	323.9	346.2
Phillips creek	32.3	372.8	405.1
Vancampens creek	55.7	410.4	466.1
Angelica creek	82.1	481.1	563.2
White creek	15.9	569.2	585.1
Black creek	31.1	595.5	666.6
Crawford creek	11.8	637.6	649.4
Caneadea creek	63.3	651.0	714.3
Cold creek	41.0	745.3	786.3
Rush creek	35.3	787.0	822.3
Wiscoye:			
East Coy creek	59.9	....	....
West Coy creek	48.7	833.6	942.2
Wolf creek	19.3	974.9	994.2
Silver Lake outlet	30.4	1,029.2	1,059.6
Coshaqua creek	82.0	1,059.6	1,141.6
Canaseraga creek	258.7	1,148.4	1,407.1
Beards creek	41.3	1,423.1	1,464.4
Conesus Lake outlet	88.8	1,555.5	1,643.9
Honeoye creek	262.6	1,675.9	1,938.5
Allen's creek	198.1	1,947.1	2,145.2
Black creek	211.8	2,168.5	2,380.0
Genesee river, total at mouth	....	....	2,445.6

a From an early report on Genesee river storage.

GENESEE RIVER AT ELMWOOD AVENUE, ROCHESTER, N. Y.

This station was established by Robert E. Horton, February 9, 1904, and was maintained by the U. S. Geological Survey in coöperation with this Department until May, 1907, when it was turned over to the Barge canal department. It is located at the Elmwood avenue bridge in Rochester, N. Y.

The stream bed is of gravel and is clean and fairly permanent. The bridge consists of six spans of about 125 feet each. Conditions are favorable for the use of a current-meter. This gage is located above the State diverting dam, which causes, however, but little fluctuation in the level.

Discharge measurements are made from the down-stream side of Elmwood avenue bridge. The initial point for soundings is the top of the face of the left abutment, down-stream side. A standard cypress staff gage, which is read under the direction of E. A. Fisher, city engineer, is secured to the down-stream face of the first pier from the right-hand abutment of the bridge. The gage is sixteen feet long and is graduated decimally with galvanized-iron division marks.

Comparative Elevations.

PLACE.	Rochester city datum.	Barge canal datum.
Zero, Elmwood avenue gage	245.591	506.848
Crest, Johnston and Seymour dam	241.91	503.16

Rating Table for Genesee River at Rochester, N. Y., for 1904–1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
1.00	400	3.70	5,080	6.40	12,600	9.10	21,760
1.10	490	3.80	5,320	6.50	12,900	9.20	22,120
1.20	580	3.90	5,560	6.60	13,220	9.30	22,480
1.30	670	4.00	5,800	6.70	13,540	9.40	22,840
1.40	760	4.10	6,060	6.80	13,860	9.50	23,200
1.50	850	4.20	6,320	6.90	14,180	9.60	23,580
1.60	1,000	4.30	6,580	7.00	14,500	9.70	23,960
1.70	1,150	4.40	6,840	7.10	14,820	9.80	24,340
1.80	1,300	4.50	7,100	7.20	15,140	9.90	24,720
1.90	1,450	4.60	7,380	7.30	15,460	10.00	25,100
2.00	1,600	4.70	7,660	7.40	15,780	10.10	25,480
2.10	1,780	4.80	7,940	7.50	16,100	10.20	25,860
2.20	1,960	4.90	8,220	7.60	16,440	10.30	26,240
2.30	2,140	5.00	8,500	7.70	16,780	10.40	26,620
2.40	2,320	5.10	8,780	7.80	17,120	10.50	27,000
2.50	2,500	5.20	9,060	7.90	17,460	10.60	27,400
2.60	2,700	5.30	9,340	8.00	17,800	10.70	27,800
2.70	2,900	5.40	9,620	8.10	18,160	10.80	28,200
2.80	3,100	5.50	9,900	8.20	18,520	10.90	28,600
2.90	3,300	5.60	10,200	8.30	18,880	11.00	29,000
3.00	3,500	5.70	10,500	8.40	19,240	11.10	29,400
3.10	3,610	5.80	10,800	8.50	19,600	11.20	29,800
3.20	3,940	5.90	11,100	8.60	19,960	11.30	30,200
3.30	4,160	6.00	11,400	8.70	20,320	11.40	30,600
3.40	4,380	6.10	11,700	8.80	20,680	11.50	31,000
3.50	4,600	6.20	12,000	8.90	21,040		
3.60	4,840	6.30	12,300	9.00	21,400		

The stream freezes over in winter at this station. Measurements of discharge through ice have been made and a record of ice conditions is kept, but the data is insufficient for a satisfactory determination of discharge at certain times.

Additional discharge data is also needed for extremely low stages, in the vicinity of gage reading 1.00.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Genesee River at Elmwood Ave., Rochester, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	512.00	509.60	509.10	510.80	509.00	510.30	508.30	508.20	507.90	507.70	*a*	507.75
2	511.70	509.30	509.00	510.40	510.70	510.10	508.30	508.10	507.90	507.70	507.60	507.75
3	510.10	509.30	509.60	510.40	511.90	509.60	508.20	508.00	507.90	507.60	507.60	507.70
4	509.70	509.20	510.40	510.20	512.00	509.10	508.30	508.00	507.90	*a*	507.60	507.70
5	509.50	509.20	510.60	509.80	511.30	508.80	508.60	508.00	508.00	507.60	507.60	507.70
6	509.30	509.10	510.10	509.70	510.50	508.70	508.90	508.00	507.90	507.60	*a*	*a*
7	509.30	509.25	511.60	509.80	510.00	508.60	508.70	507.90	507.90	507.65	507.70	507.70
8	509.10	509.30	511.70	509.70	511.30	508.60	508.50	508.10	507.80	507.65	*a*	507.70
9	509.00	509.30	511.20	509.70	512.90	508.50	508.40	508.00	507.80	507.65	507.65	507.70
10	508.80	509.30	510.70	510.40	513.10	508.30	508.20	508.00	507.80	507.60	507.65	507.70
11	509.00	509.30	510.10	510.00	513.20	508.10	508.10	508.00	507.80	*a*	507.70	507.70
12	508.80	509.30	511.60	509.70	512.10	508.10	508.00	508.00	507.80	507.60	507.70	507.70
13	509.10	509.40	513.20	509.70	510.90	508.10	508.00	508.00	507.80	507.60	507.70	*a*
14	510.40	512.77	514.45	509.60	510.30	508.10	508.00	508.00	507.70	507.60	507.70	507.70
15	510.50	512.40	515.05	509.40	510.70	508.30	508.10	508.10	507.70	507.65	*a*	507.70
16	509.70	514.35	515.50	509.10	511.80	513.30	508.10	508.10	507.70	507.60	507.70	507.70
17	509.70	515.35	515.75	509.40	511.40	511.10	508.10	508.10	507.70	507.60	507.70	507.70
18	509.50	515.55	515.00	509.50	510.90	509.60	508.40	508.10	507.70	*a*	507.70	507.70
19	509.60	514.45	513.55	509.30	510.30	508.80	509.10	508.50	507.70	507.60	507.70	507.70
20	509.70	512.00	511.80	511.45	509.80	508.70	509.50	508.50	507.70	507.60	507.70	*a*
21	508.80	511.20	511.20	512.20	509.70	508.60	508.80	508.30	507.70	507.60	507.70	507.70
22	509.00	510.60	510.40	511.20	510.10	508.50	509.20	508.20	507.70	507.60	*a*	507.70
23	509.50	510.10	510.40	510.30	509.70	508.70	510.70	508.10	507.70	507.60	507.80	507.70
24	509.80	509.60	510.80	509.80	509.70	510.20	509.70	508.00	507.70	507.60	507.70	507.70
25	510.80	509.50	511.30	509.60	509.50	509.00	509.00	508.00	507.70	*a*	507.80	*a*
26	510.50	509.20	511.20	509.40	509.20	508.80	509.70	507.90	507.70	507.60	*a*	507.75
27	510.30	509.20	510.80	509.40	508.90	508.70	509.80	507.90	507.70	507.60	507.75	*a*
28	510.00	509.40	512.00	509.20	510.30	508.60	509.40	507.90	507.70	507.65	507.70	507.75
29	510.40	509.50	512.80	509.00	509.90	508.50	509.10	507.90	507.70	507.70	*a*	507.75
30	510.20	......	512.70	508.80	509.90	508.30	508.80	507.90	507.70	507.70	507.70	507.75
31	510.00	......	511.70	......	510.20	......	508.50	507.90	......	507.70	......	507.75

a No record.

Current-meter Discharge Measurements of Genesee River at Elmwood Ave., Rochester, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Feet per second.*	*Second-feet.*
1907.					
Mar. 18	C. C. Covert	6.02	2,820	3.95	11,130
May 2	E. C. Niles	3.50	1,821	2.26	4,117
July 26	E. C. Niles	1.40	1,074	0.738	793
Aug. 12	E. C. Niles	0.95	918	0.295	271
Aug. 28	E. C. Niles	0.90	903	0.271	245
Sept. 23	E. C. Niles	0.95	917	0.313	287
1908.					
July 14	Niles & Patchke	1.20	992	0.692	*a*685

a Driftwood from opposite Sta. 240 to opposite Sta. 285, on up-stream side of pier, affected floor.

Rating Table for Genesee River at Rochester, N. Y., for 1908. a

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
1.00	400	3.70	5,080	6.40	12,600	9.10	21,760
1.10	490	3.80	5,320	6.50	12,900	9.20	22,120
1.20	580	3.90	5,560	6.60	13,220	9.30	22,480
1.30	670	4.00	5,800	6.70	13,540	9.40	22,840
1.40	760	4.10	6,060	6.80	13,860	9.50	23,200
1.50	850	4.20	6,320	6.90	14,180	9.60	23,580
1.60	1,000	4.30	6,580	7.00	14,500	9.70	23,960
1.70	1,150	4.40	6,840	7.10	14,820	9.80	24,340
1.80	1,300	4.50	7,100	7.20	15,140	9.90	24,720
1.90	1,450	4.60	7,380	7.30	15,460	10.00	25,100
2.00	1,600	4.70	7,660	7.40	15,780	10.10	25,480
2.10	1,780	4.80	7,940	7.50	16,100	10.20	25,860
2.20	1,960	4.90	8,220	7.60	16,440	10.30	26,240
2.30	2,140	5.00	8,500	7.70	16,780	10.40	26,620
2.40	2,320	5.10	8,780	7.80	17,120	10.50	27,000
2.50	2,500	5.20	9,060	7.90	17,460	10.60	27,400
2.60	2,700	5.30	9,340	8.00	17,800	10.70	27,800
2.70	2,900	5.40	9,620	8.10	18,160	10.80	28,200
2.80	3,100	5.50	9,900	8.20	18,520	10.90	28,600
2.90	3,300	5.60	10,200	8.30	18,880	11.00	29,000
3.00	3,500	5.70	10,500	8.40	19,240	11.10	29,400
3.10	3,610	5.80	10,800	8.50	19,600	11.20	29,800
3.20	3,940	5.90	11,100	8.60	19,960	11.30	30,200
3.30	4,160	6.00	11,400	8.70	20,320	11.40	30,600
3.40	4,380	6.10	11,700	8.80	20,680	11.50	31,000
3.50	4,600	6.20	12,000	8.90	21,040		
3.60	4,840	6.30	12,300	9.00	21,400		

a Applicable for open-channel conditions only.

Mean Daily Discharge, Second-feet, of Genesee River at Elmwood Ave., Rochester, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	†Dec.
1908.												
1	*a*3,340	*a*3,300	2,320	6,060	2,140	4,840	1,000	850	580	400	.....	445
2	*a*8,500	*a*2,700	2,140	5,080	5,800	4,380	1,000	760	580	400	310	445
3	*a*4,380	*a*2,700	3,300	5,080	9,060	3,300	850	670	580	310	310	400
4	*a*3,500	*a*2,500	5,080	4,600	9,340	2,320	1,000	670	580	.....	310	400
5	*a*3,100	*a*2,500	5,560	3,720	7,380	1,780	1,450	670	670	310	310	400
6	*a*2,700	*a*2,320	4,380	3,500	5,320	1,600	1,960	670	580	310	.....	.....
7	*a*2,700	*a*2,600	8,220	3,720	4,160	1,450	1,600	580	580	355	400	400
8	*a*2,320	*a*2,700	8,500	3,500	7,380	1,450	1,300	760	490	355	.....	400
9	*a*2,140	*a*2,700	7,100	3,500	12,000	1,300	1,150	670	490	355	355	400
10	*a*1,780	*a*2,700	5,800	5,080	12,600	1,000	850	670	490	310	355	400
11	*a*2,140	*a*2,700	4,380	4,160	12,900	760	760	670	490	.....	400	400
12	*a*1,780	*a*2,700	8,220	3,500	9,620	760	670	670	490	310	400	400
13	*a*2,320	*a*2,900	12,900	3,500	6,320	760	670	670	490	310	400	.....
14	*a*5,080	*a*11,700	16,950	3,300	4,840	760	670	670	400	310	400	400
15	*a*5,320	*a*10,500	19,060	2,900	5,800	1,000	760	760	400	355	.....	400
16	*a*3,500	*a*16,610	20,680	2,320	8,780	13,220	760	760	400	310	400	400
17	*a*3,500	20,140	21,580	2,900	7,660	6,840	760	760	400	310	400	400
18	*a*3,100	20,860	18,880	3,100	6,320	3,300	1,150	760	400	.....	400	400
19	*a*3,300	16,950	14,020	2,700	4,840	1,780	2,320	1,300	400	310	400	400
20	*a*3,500	9,340	8,780	7,800	3,720	1,600	3,100	1,300	400	310	400	.....
21	*a*1,780	7,100	7,100	9,900	3,500	1,450	1,780	1,000	400	310	400	400
22	*a*2,140	5,560	5,080	7,100	4,380	1,300	2,500	850	400	310	.....	400
23	*a*3,100	4,380	5,080	4,840	3,500	1,600	5,800	760	400	310	490	400
24	*a*3,720	3,720	6,060	3,720	3,500	4,840	3,500	670	400	310	400	400
25	*a*6,060	3,100	7,380	3,300	3,100	2,140	2,140	670	400	.....	490	.....
26	*a*5,320	2,500	7,100	2,900	2,500	1,780	3,500	580	400	310	.....	445
27	*a*4,840	2,500	6,060	2,900	1,960	1,600	3,720	580	400	310	445	.....
28	*a*4,160	2,900	9,340	2,500	4,840	1,450	2,900	580	400	355	400	445
29	*a*5,080	3,100	11,700	2,140	3,940	1,300	2,320	580	400	400	.....	445
30	*a*4,600	.....	11,400	1,780	3,940	1,000	1,780	580	400	400	400	445
31	*a*4,160	.....	8,500	.....	4,600	.....	1,300	580	.....	400	.....	445
Mean	.....	7,825	9,118	4,036	5,992	2,422	1,775	733	463	335	390	412

a Ice obstructions. † A little ice obstruction.

Monthly Discharge of Genesee River at Elmwood Ave., Rochester, N. Y.
[Drainage area, 2,365 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square miles.	Depth in inches.
1908.					
February 17 to 29	20,860	2,500	7,825	3.31	3.57
March	21,580	2,140	9,118	3.86	4.44
April	9,900	1,780	4,036	1.71	1.92
May	12,900	1,960	5,992	2.53	2.91
June	13,220	760	2,422	1.02	1.14
July	5,800	670	1,775	0.750	0.862
August	1,300	580	733	0.310	0.356
September	670	400	463	0.196	0.220
October	400	310	335	0.142	0.165
November	490	310	390	0.165	0.183
December	445	400	412	0.174	0.200

GENESEE RIVER AT BALLINTINE BRIDGE, N. Y.

This gaging station was originally established at the West Shore railroad bridge crossing Genesee river, by the Barge Canal Department, March 21, 1905.

The gage was of the box-and-chain type, placed in a horizontal position and secured to the lower chord of the south truss at the center of the bridge. On May 10, 1907, during repairs to this bridge the gage was removed to the bridge crossing the mouth of Black creek just above the West Shore bridge. On December 6, 1907, the gage was removed to its present location on the downstream side of Ballintine bridge, which is located one-quarter mile up-stream from the West Shore bridge.

The datum of the gage has been maintained at elevation 528.37 since the establishment of the station. Current-meter measurements were formerly made at the West Shore railroad bridge, but were discontinued, owing to the proximity of this station to the Elmwood avenue gaging station in Rochester.

The drainage area at the West Shore railroad bridge is about 2,322 square miles, the principal tributaries intervening between the West Shore railroad bridge and the Elmwood avenue bridge being Little Black creek on the west, draining 19 square miles, and Red creek on the east, draining 24 square miles.

Black creek, which enters between the West Shore bridge and Ballintine bridge, drains 212 square miles, leaving a net drainage area at Ballintine bridge of about 2,110 square miles.

The gage is read at 9 a. m. each day by Martin Hunkley.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Genesee River at Baldwin Bridge.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	515.00	510.40	509.80	513.00	509.70	512.20	508.80	508.50	507.90	507.80	507.70	507.80
2	512.80	510.10	509.60	512.20	511.80	511.80	508.70	508.30	507.90	507.80	507.70	507.80
3	511.80	509.90	510.90	512.40	514.50	510.70	508.70	508.30	507.80	507.80	507.70	507.70
4	510.90	509.70	512.00	511.80	514.90	510.10	508.60	508.10	507.80	507.70	507.70	507.70
5	510.70	509.60	512.30	511.20	513.90	509.60	508.90	508.10	507.80	507.70	507.70	507.70
6	510.20	509.50	511.80	511.10	512.50	509.40	509.20	508.20	507.80	507.70	507.70	507.70
7	510.10	509.40	513.70	511.40	511.70	509.20	509.00	508.20	507.80	507.70	507.70	507.70
8	509.90	509.40	514.50	511.20	513.10	509.00	508.80	508.40	507.80	507.70	507.80	507.70
9	509.70	509.70	513.70	511.20	516.30	508.90	508.50	508.30	507.80	507.70	507.80	507.70
10	09.50	509.70	512.60	512.30	516.60	508.70	508.40	508.30	507.80	507.70	507.80	507.80
11	509.50	509.60	511.70	511.70	517.00	508.60	508.30	508.20	507.80	507.70	507.80	507.80
12	509.40	509.60	513.90	511.20	514.80	508.60	508.30	508.20	507.80	507.70	507.80	507.80
13	510.20	509.80	515.90	510.80	513.10	508.50	508.20	508.20	507.80	507.70	507.80	507.80
14	511.50	514.60	518.50	510.60	512.00	508.50	508.20	508.30	507.70	507.70	507.80	507.80
15	511.70	516.10	519.40	510.40	512.80	509.00	508.20	508.20	507.70	507.70	507.80	507.80
16	510.80	518.30	520.20	510.20	514.60	5 .00	508.30	508.10	507.70	507.70	507.80	507.80
17	510.60	519.70	520.70	510.70	513.60	513.30	508.30	508.10	507.70	507.70	507.80	507.90
18	510.30	520.00	519.80	510.40	513.10	510.90	508.30	508.40	507.70	507.70	570.80	507.90
19	510.20	518.40	517.50	510.50	511.70	509.80	509.30	508.90	507.70	507.70	507.80	507.90
20	510.20	514.80	514.60	513.70	511.30	509.20	510.50	508.70	507.70	507.70	507.80	508.00
21	509.50	513.20	513.60	515.10	511.10	50 .00	509.70	508.40	507.70	507.70	507.90	508.00
22	509.70	511.90	512.50	513.50	512.00	50 .90	510.30	508.20	507.70	507.70	507.90	508.20
23	510.60	11.50	512.40	512.10	511.70	508.80	512.80	5 8.10	507.70	507.70	507.90	508.20
24	510.80	510.70	513.00	511.20	511.10	509.30	510.70	508.00	507.70	507.70	507.80	508.10
25	511.60	510.40	513.80	510.70	510.40	512.10	509.70	508.00	507.70	507.70	507.80	507.90
26	511.50	510.10	513.60	510.40	510.10	511.00	510.70	508.00	507.70	507.70	507.80	507.90
27	511.60	510.00	513.00	510.30	509.80	509.80	510.80	508.00	507.70	507.70	507.80	50 .00
28	511.20	510.00	514.90	510.20	512.00	509.40	509.60	508.00	507.70	507.70	507.80	508.00
29	511. 0	509.90	516.00	509.90	511.50	508.90	509.10	507.90	507.70	507.70	507.80	508.00
30	510.80	......	515.80	509.80	510.70	508.80	508.80	507.90	507.80	507.70	507.60	508.10
31	510.60	......	514.30	......	512.00	......	508.60	507.90	......	507.70	......	508.20

GENESEE RIVER AT JONES BRIDGE NEAR MT. MORRIS, N. Y.

A current-meter gaging station was established at this point May 22, 1903. Observations of the stream gage are taken each morning and evening by J. T. Trewer. The discharge measurements are made from a foot-bridge erected on the outriggers of the down-stream side of the highway bridge, which consists of two spans of 174.3 and 31.7 feet, respectively. A weight-and-chain gage, 15.5 feet in length, is secured to the truss uprights near the center of the main bridge span on the up-stream side. The bench-mark is corner of wing wall, left-hand abutment, up-stream side; assumed elevation, 100.00. Elevation of datum plane of gage, 69.64 feet.

The river channel is of clay and is straight for several hundred feet below gage. About 300 feet above the bridge is an abrupt bend. The gaging station is located a short distance below the inflow of Canaseraga creek. The course of Genesee river below Mt. Morris is very winding, traversing from side to side a flood-plain of 1½ miles average width.

Cuba reservoir on the Genesee-Allegheny divide receives the drainage from a tributary area of 26.6 square miles. The storage

volume is 454,000,000 cubic feet.* The overflow from this reservoir enters Allegheny river. The storage water may be turned into the summit level of the abandoned Genesee Valley canal and thence into Genesee river.

In the reports of the State Engineer for the years 1903 and 1904 the gagings at this station were published under the caption, "Genesee river at Jones bridge near Mt. Morris, Livingston Co., N. Y." Substantially the same heading was used in subsequent reports, and it was stated in this and other reports that the gaging station is located a short distance below the inflow of Canaseraga creek. Attention is called to this by the publication in the report of the State Water Supply Commission for 1908 of the following misstatement referring to this gaging station: "The results have been published without making it plain that this third Mt. Morris station was at Jones bridge below the mouth of Canaseraga creek."

Unfortunately a mistake was made in the use of the drainage area in computing the run-off at Jones bridge, said area being taken from an old map before the topographic sheets for the drainage basin were completed.

Mean Daily Gage Height, in Feet, of Genesee River at Jones Bridge, near Mt. Morris, N Y

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	3.8	3.65	3.1	3.8
2	......	3.85	3.65	3.45	3.9
3	......	3.6	3.6	3.5	3.75
4	......	......	2.95	3.5	3.5
5	......	......	3.6	3.45	3.55
6	......	......	3.6	3.6	3.3
7	......	3.7	3.5	3.55	3.55
8	......	3.8	3.45	3.5	3.65
9	......	3.6	3.55	3.5	3.7
10	......	3.55	3.6	3.65	3.8
11	4.55	3.6	3.2	3.75	3.6
12	4.65	3.65	3.65	3.65	3.55
13	4.6	3.25	3.6	4.0	3.35
14	4.6	3.7	3.6	4.0	3.6
15	4.45	3.7	3.5	3.75	3.7
16	4.35	3.65	3.55	3.65	3.9
17	4.75	3.4	3.55	3.75	3.9
18	5.6	3.75	3.15	3.85	4.05
19	5.15	3.45	3.55	3.85	4.1
20	4.75	3.1	3.6	3.95	4.1
21	4.55	3.5	3.4	4.15	4.1
22	4.25	3.55	3.45	4.05	4.1
23	4.2	3.55	3.5	3.9	4.75
24	4.3	3.55	3.4	3.9	4.75
25	4.3	3.5	3.3	3.9	4.5
26	4.1	3.45	3.5	3.85	4.25
27	4.0	3.05	3.6	3.85	4.05
28	4.05	3.55	3.5	3.8	4.1
29	3.95	3.65	3.55	3.6	4.1
30	3.75	3.7	3.55	3.7	4.0
31	3.85	......	3.55	......	4.2

NOTE.— The discharge was probably more or less affected by ice conditions, Dec. 15 to 31.

* Including Rockville reservoir.

Current-meter Discharge Measurements of Genesee River at Jones Bridge, near Mt. Morris, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
Aug. 12...	Brett and Allen	84	251	4.68	563
Sept. 10...	C. R. Adams	71	184	3.80	232
Oct. 21...	C. R. Adams	67	164	3.53	156

Rating Table for Genesee River at Jones Bridge, near Mt. Morris, N. Y., for 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
2.90	35	3.60	175	4.30	410	5.00	710
3.00	45	3.70	205	4.40	450	5.10	760
3.10	60	3.80	235	4.50	490	5.20	810
3.20	80	3.90	265	4.60	530	5.30	860
3.30	100	4.00	300	4.70	575	5.40	910
3.40	125	4.10	335	4.80	620	5.50	960
3.50	150	4.20	370	4.90	665	5.60	1,010

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on 3 discharge measurements made during 1908, and is well defined between gage heights 3.5 feet and 4.7 feet.

Mean Daily Discharge, Second-feet, of Genesee River at Jones Bridge, near Mt. Morris, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	235	190	60	235
2	......	250	190	138	265
3	......	175	175	150	220
4	......	*a*180	40	150	150
5	......	*a*180	175	138	162
6	......	*a*190	175	175	100
7	......	205	150	162	162
8	......	235	138	150	190
9	......	175	162	150	205
10	......	162	175	190	235
11	510	175	80	220	175
12	552	190	190	190	162
13	530	90	175	300	112
14	530	205	175	300	175
15	470	205	150	220	....
16	430	190	162	190	....
17	598	125	162	220	....
18	1,010	220	70	250	....
19	785	138	162	250	....
20	598	60	175	282	....
21	510	150	125	352	....
22	390	162	138	318	....
23	370	162	150	265	....
24	410	162	125	265	....
25	410	150	100	265	....
26	335	138	150	250	....
27	300	52	175	250	....
28	318	162	150	235	....
29	282	190	162	175	....
30	220	205	162	205	....
31	250	......	162	....	....

a Discharge estimated.

Monthly Discharge of Genesee River at Jones Bridge, near Mt. Morris, N. Y.
[Drainage area, 1,410 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.	Accuracy.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.	
1908.						
August 11-31	1,010	220	467	.331	.26	A
September	250	52	171	.121	.14	A
October	190	40	151	.107	.12	A
November	352	60	216	.153	.17	A
December	....	....	230	.163	.19	B

NOTE.— Discharge, Dec. 15 to 31, estimated, 270 second-feet.

Current-meter Discharge Measurement of Canaseraga Creek, near West Sparta, N. Y.

DATE.	Hydrographers.	Width.	Area of section.	Gage height to water-surface.a	Discharge.
		Feet.	*Square feet.*	*Feet per second.*	*Second-feet.*
1908. July. 23	G. M. Brett and C. R. Adams	46	79.7	11.10	142

a Reference point is top of down-stream end of second floor beam from right end of truss. Initial point for soundings is face of right abutment.

GENESEE RIVER AT MT. MORRIS, N. Y.

A gaging station has been established at the dam of the Mt. Morris Water Power Company, in the village of Mt. Morris, N. Y., and readings have been taken regularly twice each day, by John McAstocker, since September 1, 1905.

The station was established by Robert E. Horton, and is maintained by the U. S. Geological Survey in coöperation with this Department.

The dam is of masonry construction, having a horizontal crest of ogee cross-sections, 255.7 feet long. There are two wasteways, having crests each 12 inches wide and 18.0 feet and 17.9 feet long, respectively, closed by stop-planks to about two feet above the main crest; also one short spillway with crest 6 inches wide and 17 feet long, and about one foot higher than the wasteways. The dam and the spillways are separated by masonry piers.

A portion of the flow is diverted through a section of the old Genesee Valley canal, which is utilized as a head-race, the power being used to drive a number of mills and factories. In order to

determine the amount of this diversion, a gage has been placed in the tail-race below the mills, and it is read twice each day by F. M. Goff, electrical engineer in the employ of the Power Company. A number of meter measurements have been made and a rating curve to determine the daily flow through the canal is partly developed.

Current-meter Discharge Measurements of Tail Race of Mt. Morris Power Plant at Mt. Morris N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
May 7...	D. M. Wood	36	100	2.23	196
July 22...	Adams and Brett	30	67.0	2.04	144
Aug. 12...	Brett and Allen	30	74.4	1.91	150
Sept. 10*a*..	C. R. Adams	29	58.1	1.64	121
Oct. 21...	C. R. Adams	29	63.6	1.81	130

a No flow over the dam; leakage about 2 second-feet; waste from canal about 4 second-feet.

Mean Daily Discharge, Second-feet, of Genesee River at High Dam, Mt. Morris, N. Y.

DAY.	March.	April.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.							
1	......	4,840	......	274	187	417	1,500
2	......	2,140	......	274	216	545	1,140
3	......	2,050	......	289	231	572	2,070
4	......	1,640	......	245	245	460	3,320
5	......	1,970	......	231	289	545	1,990
6	......	2,050	......	274	274	598	1,660
7	......	1,880	......	274	216	1,640	1,430
8	......	1,480	......	245	260	1,120	1,430
9	......	1,410	......	216	216	1,060	1,660
10	......	1,270	......	274	216	872	1,660
11	......	1,340	......	274	202	809	1,220
12	......	2,050	......	274	216	809	955
13	......	1,720	......	703	245	783	955
14	......	1,340	......	417	375	651	776
15	......	1,270	......	417	417	598	437
16	......	1,560	......	417	318	598	352
17	1,340	1,410	......	703	318	598	437
18	1,590	1,340	......	545	318	598	395
19	23,500	......	......	460	289	598	437
10	16,400	......	......	375	809	502	544
21	9,850	......	......	332	809	502	671
22	8,290	......	......	303	783	417	6,750
23	8,450	......	......	274	783	417	3,110
24	13,100	......	......	303	756	375	2,070
25	14,400	......	......	245	703	375	1,360
26	11,100	......	......	245	677	460	1,080
27	15,200	......	245	216	545	502	1,020
28	9,930	......	216	216	572	417	829
29	7,460	......	216	216	502	2,590	4,010
30	5,810	......	216	202	481	4,110	4,980
31	4,420	......	274	......	439	......	2,070

March 17-31, tail race discharge assumed, 220 second-feet; April 1-18, tail race discharge assumed, 150 second-feet; Aug. 27-Nov. 30, tail race discharge assumed, 150 second-feet; Dec. 1-31, tail race discharge assumed, 170 second-feet.

Mean Daily Discharge, Second-feet, of Genesee River at High Dam, Mt. Morris, N. Y.

DAY.	Feb.	Ma	June.	July.	Aug.	Se	r.	Dec.
1906.								
1	985		814	214	259		50	859
2	806		814	306	227		90	1,060
3	552		722	315	279		60	968
4	467	1	658	363	444		50	552
5	467	1	565	459	445		90	648
6	510		1,680	419	319		20	2,950
7	595		2,270	326	306		30	8,450
8	648		985	227	630		77	2,220
9	806		710	317	577		06	1,640
10	859		545	315	465		80	1,800
11	985		629	306	380		77	3,590
12	859		559	288	772		09	1,700
13	552		456	247	541		00	1,390
14	552		422	262	444		40	1,460
15	467		422	110	328		10	4,640
16	467		392	248	290		50	4 990
17	467		433	431	279		31	2,550
18	467		692	286	288		00	1,880
19	467		674	277	199		80	922
20	382		577	306	940		50	868
21	510		486	315	1,840		10	1,130
22	806		462	181	958		40	985
23	806		440	274	682		50	713
24	701		390	221	895		470	510
25	859		498	207	691		170	552
26	859		419	234	398		330	561
27	648	2	364	221	474		270	648
28	467	10	355	377	612		550	968
29		4	362	267	504		400	753
30	...	5	306	265	398		050	665
31		8	..	279	306			1,340

Jan. and Feb., tail race discharge assumed, 200 second-feet, Sept. and Oct., tail race discharge assumed, 150 second-feet.

Mean Daily Discharge, Second-feet, of Genesee River at High Dam, Mt. Morris, N. Y.

DAY	Jan.	F
1907.		
1	4,290	
2	2,270	
3	1,850	
4	6,210	
5	4,520	
6	2,550	
7	3,040	
8	9,410	
9	7,800	
10	3,690	
11	2,640	
12	2,190	
13	2,190	
14	1,770	
15	3,460	
16	1,850	
17	1,110	
18	1,050	
19	1,530	
20	7,070	
21	4,400	
22	1,850	
23	1,250	
24	985	
25	859	
26	1,250	
27	985	
28	985	
29	985	
30	985	
31	859	

Jan. to April, tail race discharge assumed, 200 second-feet. Sept. to Oct., tail race discharge assumed, 190 second-feet.

Mean Daily Discharge, Second-feet, of Genesee River at High Dam, Mt. Morris, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	2,520	618	829	2,710	1,660	3,110		346	177	193	111	201
2	1,990	522	1,500	3,320	3,550	1,990		474	193	177	185	185
3	1,860	437	2,900	2,400	4,940	1,360		346	209	193	170	201
4	1,510	522	2,330	1,820	3,320	1,060		288	193	111	185	185
5	1,0[illegible]	[illegible]	1,990	1,820	2,520	955		288	[illegible]	226	201	185
6	7[illegible]		1,990	2 330	1,820	829		431	153	193	185	99
7	8[illegible]		2,520	1,820	2,520	723		431	193	177	170	201
8	8[illegible]		2,710	1,540	6,320	723		346	209	162	111	201
9	8[illegible]		1,990	4 490	6,040	618		516	201	162	185	201
10	6[illegible]		1,990	2,330	6,890	618		431	193	162	185	185
11	6[illegible]		2,160	2,160	3,550	671		288	185	99	201	201
12	1,0[illegible]		5,230	1,660	2,520	522		266	209	142	201	201
13	3,1[illegible]		9,710	1,360	1,820	437		344	135	148	215	99
14	2,1[illegible]		12,500	1,220	2,520	522		306	177	148	185	201
15	1,5[illegible]		14,400	1,140	4,490	6,890		330	162	148	247	231
16	1,3[illegible]		11,100	2,160	3,780	1,820		309	193	148	185	228
17	8[illegible]		4,730	2,160	2,900	1,220		437	162	135	267	251
18	8[illegible]		3,550	1 220	1,990	723		715	177	129	231	267
19	8[illegible]		4,730	5 230	1,500	618		529	177	177	231	309
20	6[illegible]		3,110	4 490	1,500	723		425	111	193	251	317
21	7[illegible]		2,160	3 110	2,710	723		328	162	148	325	296
22	9[illegible]		2,330	2,240	2,160	618		294	162	155	305	284
23	1,0[illegible]		3,110	1 540	1,660	522		281	162	162	251	201
24	8[illegible]		4,250	1,430	1,060	5,230		350	148	162	251	185
25	5[illegible]		4,010	1,360	1,060	1,660		257	148	111	267	94
26	6[illegible]		3,320	1,360	955	1,220		238	142	155	267	325
27	8[illegible]		5,760	1,140	4,490	723		214	99	142	200	317
28	7[illegible]		7,770	1,020	2,330	829		192	177	185	201	325
29	6[illegible]		7,770	829	1,360	437		216	193	185	111	279
30	5[illegible]		4,490	892	3,780	437		250	193	170	201	296
31	5[illegible]		3,110		3,780			248	.....	185	....	267

January to July, tail race discharge assumed, 170 second-feet. August 1 to 11, tail race discharge assumed, 164 second-feet. After August 11, discharge through the tail race determined from daily gage heights.

Monthly Discharge of Genesee River at High Dam, Mt. Morris, N. Y.
[Drainage area, 1,070 square miles.]

MONTH.	Discharge in Second-feet.				Run-off.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.
1905.					
March 17-31	23,500	1,340	10,100	9.44	5.27
April 1-18	4,840	1,270	1,820	1.70	1.14
August 27-31	274	216	233	.218	.04
September	703	202	324	.303	.34
October	809	187	416	.389	.45
November	4,110	375	818	.764	.85
December	6,750	352	1,690	1.58	1.82
1906.					
January	7,070	573	1,900	1.78	2.05
February	985	382	643	.601	.63
March	10,900	306	1,520	1.42	1.64
April	5,530	539	2,450	2.29	2.56
May	3,900	529	1,230	1.15	1.33
June	2,270	306	637	.595	.66
July	489	116	287	.268	.31
August	1,840	199	522	.488	.56
September	460	180	255	.238	.27
October	4,110	332	1,250	1.17	1.35
November	7,010	780	1,790	1.67	1.86
December	8,450	510	1,730	1.62	1.87
The year	10,900	116	1,180	1.11	15.09
1907.					
January	9,410	859	2,770	2.59	2.99
February	985	467	696	.65	.68
March	7,360	467	2,990	2.79	3.22
April	8,270	859	2,130	1.99	2.22
May	2,750	674	1,400	1.31	1.51
June	3,070	477	1,140	1.07	1.19
July	3,470	313	922	.862	.99
August	313	82	216	.202	.23
September	585	190	234	.219	.24
October	2,540	314	642	.600	.69
November	3,260	267	848	.793	.88
December	13,200	294	2,370	2.21	2.55
The year	13,200	82	1,360	1.27	17.39

Monthly Discharge of Genesee River at High Dam, Mt. Morris, N. Y.
[Drainage area, 1,070 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches.
1908.					
January	3,110	565	1,110	1.04	1.20
February	23,000	437	2,450	2.29	2.47
March	14,400	829	4,520	4.22	4.86
April	5,230	829	2,090	1.95	2.18
May	6,890	955	2,950	2.76	3.18
June	6,890	437	1,280	1.20	1.34
July	6,320	236	1,030	.963	1.11
August	715	192	342	.319	.37
September	209	99	173	.162	.18
October	226	99	161	.150	.17
November	325	111	209	.195	.22
December	367	94	230	.215	.25
The year	23,000	94	1,380	1.29	17.53

NOTE.—Discharge determined by adding the flow over the dam to the flow through the tail-race. Discharge through the waterway near the head of the canal has been disregarded.

Results are considered to be fairly good for medium and high stages. At low stages estimates may be affected by insufficient gage readings to take account of pondage. At very low stages, when practically all the water flows through the tail-race, estimates are good when based upon gage heights and occasional discharge measurements.

For 1908, when available, the estimate at the Jones bridge and St. Helena stations are considered to be more reliable than those at this station.

CANADICE LAKE.

DESCRIPTION.

Canadice lake is tributary to Genesee river through Hemlock lake outlet and Honeoye creek. The area drained by the lake forms an irregular rectangle, the lake lying somewhat to the left of the longitudinal axis and the greater portion of the drainage being on the eastern slope. The western slope is narrow and precipitous. Bald Hill rises from an altitude of 1,090 feet at the lake to 1,800 feet at the summit and has its axis parallel to the lake at an average distance of three-fourths of a mile from it. The lake has a water-surface area of 0.7 square mile and drains a total area of 12.6 square miles, 5.6 per cent of which is lake surface.

CANADICE LAKE OUTLET NEAR HEMLOCK, N. Y.

A weir was constructed at the outlet at the foot of the lake by the city engineer's department of Rochester, N. Y., in February, 1903. The entire yield of the drainage basin passes this weir.

A standard thin-edged weir, with a five-foot crest and two end contractions, is so arranged with needle-timbers at the ends that during high water the length may be increased to 14.96 feet with no end contractions. The weir crest stands three feet above the stream channel and is never submerged by backwater. There are two additional rectangular gates each one foot square, with three complete contractions and a fourth partial contraction at the bottom. The outflow from the lake above the weir is controlled by gates.

A reading of the depth of the weir is taken each morning, and also for each change of the gates, the depth being read to hundredths and corrections being made for velocity of approach for the larger discharges. The discharge is calculated by the Francis formula. The record has been furnished by E. A. Fisher, city engineer, and John F. Skinner, principal assistant city engineer, of Rochester, N. Y.

Estimated Monthly Discharge of Canadice Lake Outlet near Hemlock, N. Y.

MONTH.	Mean discharge in second-feet.	Mean elevation of lake above low water, in feet.
1908.		
January	26.4	2.042
February	23.2	1.658
March	33.6	2.143
April	16.5	2.146
May	32.0	1.893
June	10.2	2.479
July	11.2	2.213
August	8.6	1.448
September	4.3	0.718
October	2.9	0.155
November	4.0	—0.345
December	3.7	—0.841
The year	14.7	1.309

OSWEGO-ONEIDA-SENECA RIVER DRAINAGE BASIN.

DESCRIPTION OF BASIN.

Oswego river is formed by the union of Seneca and Oneida rivers at Three River Point about twelve miles northwest of Syracuse, N. Y., whence its course is northwestward to Oswego, where it enters Lake Ontario. The length of the river from the junction to the mouth, is about 20.5 miles, and the drainage basin along this distance is a narrow strip of country, moderately rolling. Above the junction of Seneca and Oneida rivers the basin spreads out, attaining an extreme width east and west of about 100 miles and north and south of from seventy to eighty miles. There is, on the whole, a gradual rise from the low, level lands which border Lake Ontario to the north-south ridges which separate the various lakes south of Seneca river and which farther south become merged with the still more elevated country lying along the southern boundary of the Lake Ontario watershed.

The most remarkable feature of the drainage basin is the chain of lakes stretching across its southern border. From west to east the principal lakes are, in order, Canandaigua, Keuka, Seneca, Cayuga, Owasco, Skaneateles and Oneida. These seven lakes include a water-surface of, approximately, 280 square miles, increased by four smaller lakes — Cross, Onondaga, Otisco and Cazenovia — to about 295 square miles. The larger of the lakes, Oneida, Cayuga and Seneca, are used for steam-towing navigation, having connection with the Erie and Oswego canals. Cayuga and Seneca lakes are noted for their depth and for the abrupt slopes of their beds. The influence of the lakes on Oswego river is of the utmost importance in contributing to the steadiness of its flow.

A fall of 100 feet in the course of the main river is largely utilized by seven dams, which also partly canalize the stream. The intervening stretches are covered by the Oswego canal, which draws its water-supply from the river.

Drainage Areas Tributary to Oneida Lake and Oneida River. a

NAME OF STREAM.	Area in Square Miles.		
	Place to place.	Sub-total.	Total.
East branch, Fish creek.			
Head to junction with Alder creek	45.4		
Alder creek	25.7	71.1	
Junction with Alder creek to junction with Point Rock creek	36.7	107.8	
Point Rock creek	19.9	127.7	
Junction with Point Rock creek to junction with Fall brook	4.5	132.2	
Fall brook	13.5	145.7	
Junction with Fall brook to junction with Florence creek	1.3	147.0	
Florence creek	20.4	167.4	
Junction with Florence creek to junction with Furnance creek (Taberg)	1.7	169.1	
Furnace creek	14.4	183.5	
Taberg to junction with West branch, Fish creek	3.6	187.1	
West branch, Fish creek.			
Head to lower dam, Williamston	25.8	25.8	
Williamston to West Camden	27.1	52.9	
West Camden to junction with Mad river, Camden	14.2	67.1	
Mad river	45.4	112.5	
Camden to junction with Little river	21.6	134.1	
Little river	52.1	186.2	
Little river to McConnellsville	4.0	190.2	
McConnellsville to junction with East branch, Fish creek	11.9	202.1	
Junction of East and West branches, Fish creek, to Junction with Wood creek	27.8	389.2	417.0
Wood creek.			
Above Erie canal, Rome	10.2	10.2	
Erie canal, Rome, to junction with Mud creek	2.0	12.2	
Mud creek	20.0	32.2	
Junction with Mud creek to junction with Canada creek	6.4	38.6	
Canada creek	31.0	69.6	
Junction with Canada creek to junction with Stoney creek	1.2	70.8	
Stoney creek	20.4	91.2	
Junction with Stoney creek to junction with Fish creek	31.4	122.6	126.6
Oneida creek.			
Head to Peterboro	13.4	13.4	
Peterboro to falls	6.7	20.1	
Falls to Munsville	15.6	35.7	
Munsville to Kenwood	27.3	63.0	
Kenwood to Oneida Castle (State dam)	10.8	73.8	
Oneida Castle to Sconondoa creek, Oneida	2.1	75.9	
Sconondoa creek	34.3	110.2	
Sconondoa creek to Durhamville	4.8	115.0	
Durhamville to mouth	28.0	143.0	143.0
Canaseraga creek.			
Head to Perryville	5.7		
Perryville to Erie canal	9.0	14.7	
Erie canal to Douglas ditch	8.1	22.8	
Cowassalon creek.			
Head to Clockville creek	17.2	17.2	
Clockville creek	11.1	28.3	
Clockville creek to Erie canal	5.5	33.8	
Erie canal to mouth of Douglas ditch	39.3	73.1	
Junction with Douglas ditch to Lakeport	3.2	95.9	99.1
Chittenango creek.			
Erieville reservoir, water-surface	.45		
Erieville reservoir, land drainage	3.30	3.75	
Erieville reservoir, to Cazenovia lake	30.5	34.25	
Cazenovia lake, water-surface	1.7	35.95	
Cazenovia lake, land drainage	8.7	44.65	
Cazenovia lake to Chittenango falls	14.4	59.05	
Chittenango falls to State dam, Chittenango	17.9	76.95	
State dam to junction with Butternut creek	28.1	105.05	
Butternut creek.			
Head to Jamesville reservoir	47.4	47.4	
Jamesville reservoir to State dam	5.7	53.1	
State dam to junction with Limestone creek	19.2	72.3	

a From United States Geological Survey topographic maps.

Drainage Areas Tributary to Oneida Lake and Oneida River — (Concluded).

NAME OF STREAM.	Area in Square Miles. Place to place.	Sub-total.	Total.
Limestone creek.			
De Ruyter reservoir, water-surface	1 0		
De Ruyter reservoir, land drainage	17.8	18.8	
De Ruyter reservoir to junction with East branch	4.3	23.1	
East, or New Woodstock branch	12.6	35.7	
Junction with East branch to junction with West branch	34.5	70.2	
West branch, Limestone creek, enters above State feeder dam	24.8	95.0	
State dam to junction with Butternut creek	18.2	113.2	185.5
Junction with Limestone creek to Chittenango creek	1.1	186.6	291.65
Chittenango creek, junction with Butternut creek to Bridgeport	30.3	321.95	
Chittenango creek, Bridgeport to Oneida lake	4.3	326.25	326.25
Oneida lake drainage through main streams	....	1,107.95	
Big Bay creek	26.3		
Little Bay creek	11.5		
Scriba creek	45.4		
Coast drainage, north shore Oneida lake	54.5		
Coast drainage, south shore Oneida lake	28.9	166.6	1,274 55
Water-surface, Oneida lake	78		
Land drainage, Oneida lake	1,274.55	1,352.55	
Oneida river.			
Brewerton to Caughdenoy creek	4.8	4.8	1,357.9
Caughdenoy creek	19.3	24.1	1,376.7
Caughdenoy creek to Oak Orchard	25.1	49.2	1,401.8
Mud creek	34.7	83.9	1,436.5
Oak Orchard to Potts creek	5.0	88.9	1,441.5
Potts creek	22.9	111.8	1,464.4
Six Mile creek	24.0	135.8	1,488.4
Potts creek to Three River Point	4.5	140.3	1,492.9

Drainage Areas Tributary to Seneca River. a

NAME OF STREAM.	Area in Square Miles. Place to place.	Sub-total.	Branch total.	General total.
Mud creek.				
Head to and including Schaffer creek	51.31			
Junction with Schaffer creek to junction with Sucker brook, Victor (formerly Ganargua creek)	25.70	77.01		
Sucker brook	20.15	97.16		
Ganargua creek.				
Victor to Erie canal, Macedon	26.20	123.36		
Macedon to junction with East Red creek, East-Palmyra	55.0	178.36		
East Red creek	59.5	237.86		
East Red creek to Canandaigua outlet	61.37	299.23	299.23	
Canandaigua lake.				
Naples creek	48.55	171.97		
West river	42.08			
Other land drainage	81.34			
Water-surface	16.40	....	188.37	
Canandaigua outlet.				
Foot of lake to and including Black brook	50.37	238.74		
Black brook to Flint creek, at Phelps	54.34	293.08	293.08	

a From United States Geological Survey topographic maps.

Drainage Areas Tributary to Seneca River — (Continued).

NAME OF STREAM.	AREA IN SQUARE MILES.			
	Place to place.	Sub-total.	Branch total.	General total.
Flint creek.				
Above Patten	31.59			
Patten to Gorham, not including Gorham swamp	24.84	56.43		
Gorham swamp	5.46	61.89		
Gorham to Orleans	25.57	87.46		
Orleans to junction with Canandaigua outlet at Phelps	15.21	102.67	395.75	
Phelps to junction with Ganargua creek at Lyons, forming Clyde river	48.36	444.11	743.34	
Clyde river.				
Lyons to junction with Seneca river, foot of Cayuga lake	141.11	884.45	....	884.45
Seneca river.				
Seneca lake.				
Keuka lake.				
Land drainage to outlet	160.96			
Water-surface	17.51	178.47		
Keuka outlet to Seneca lake	24.80	203.27		
Catharine creek.				
Above Montour Falls	66.46	....	640.93	
Montour Falls to Seneca lake	29.91	96.37		
Watkins Glen creek	23.53	23.53		
Direct lake drainage	317.76	317.76		
Water-surface	67.16	....	708.09	
Seneca river, foot of Seneca lake to Waterloo	40.90	....	748.99	
Seneca river, Waterloo to Seneca Falls	28.55	....	777.54	
Seneca river, Seneca falls to Mud lock, foot of Cayuga lake	7.52	....	785.06	
Cayuga lake.				
Cascadilla creek	14.38			
Six Mile creek	59.05			
Buttermilk creek	29.16			
Cayuga inlet	67.02			
Salmon creek	91.13			
Fall creek.				
Above Freeville	58.68			
Virgil creek	26.00	84.68		
Freeville to Cornell dam	30.62	115.20		
Cornell dam to Cayuga lake	1.56	116.76		
Taghanic creek.				
Above Halseyville	56.96			
Halseyville to Taghanic falls	10.40	67.36		
Taghanic falls to Cayuga lake	.39	67.75		
Other Cayuga lake drainage	275.04	720.29		
Cayuga lake, water-surface	66.31	786.60	1,571.60	
Seneca river, Cayuga lake, to junction with Clyde river	15.42	....	1,587.02	2,471.47
Seneca river, junction with Clyde river to junction with Owasco outlet	146.23	....	....	2,617.70
Owasco lake.				
Owasco inlet, above Moravia	74.33			
Moravia to Owasco lake	42.92	117.25		
Direct drainage to lake	76.24	193.49		
Foot of lake to State dam	.98	194.47		
Water-surface	10.40	204.87		
Owasco outlet to junction with Seneca river	16.73	221.66	....	2,839.30
Seneca river, junction with Owasco outlet to junction with Skaneateles outlet	98.70	....	....	2,938.00
Skaneateles lake.				
Land drainage to foot	58.41			
Water-surface	14.13	72.54		
Foot of lake to Willow Glen	1.84	74.38		
Willow Glen to Seneca river	16.69	91.07	....	3,029.07
Seneca river, Skaneateles outlet to Carpenter brook	25.50	....	....	3,054.57
Carpenter brook	18.70	....	....	3,073.27
Carpenter brook to Baldwinsville	48.10	....	....	3,121.37
Baldwinsville to Onondaga outlet	17.80	....	....	3,139.17

Drainage Areas Tributary to Seneca River — (Concluded).

NAME OF STREAM.	AREA IN SQUARE MILES.			
	Place to place.	Sub-total.	Branch total.	General total.
Onondaga lake.				
Otisco lake, land drainage to foot.....	41.40			
Otisco lake, water-surface..........	3.30	44.70		
Nine Mile creek (Otisco outlet) to Onondaga lake....................	74.0	118.70		
Onondaga creek.				
Above junction with West brook...	40.6			
Junction with West brook to inflow to Onondaga lake.............	65.3	105.9		
Other land drainage to Onondaga lake.	59.1	283.7		
Onondaga lake, water-surface.......	4.7	288.4		
Onondaga lake, outlet to Seneca river.	3.0	291.4	....	3,430.57
Seneca river, Onondaga outlet to Belgium	10.12	....	....	3,440.69
Seneca river, Belgium to Three River Pt..	4.4	....	....	3,445.09

Drainage Areas Tributary to Oswego River. a

NAME OF STREAM.	AREA IN SQUARE MILES.		
	Place to place.	Total from Three River Point.	Total drainage basin.
Oneida river, above Three River Point..............	....	....	1,493
Seneca river, above Three River Point..............	....	....	3,445
Oswego river at Three River Point..................	....	....	4,938
Three River Point to Phoenix.....................	2.32	2.32	4,940.32
Phoenix to Hinmansville..........................	17.58	19.90	4,957.90
Hinmansville to Ox creek.........................	17.05	37.15	4,975.15
Ox creek....................................	33.68	70.83	5,008.83
Ox creek to upper dam, Fulton....................	9.15	79.98	5,016.98
Fulton to Neatawanta creek.......................	9.15	89.13	5,027.13
Neatawanta creek...........................	21.92	111.05	5,049.05
Neatawanta creek to Black creek..................	1.01	112.06	5,050.06
Black creek.................................	37.93	149.99	5,087.99
Black creek to Battle Island......................	.92	150.91	5,088.91
Battle Island to Minetto.........................	2.11	153.02	5,091.02
Minetto to High dam	4.87	157.89	5,095.89
High dam to Oswego dam	1.22	159.11	5,097.11
Oswego dam to Lake Ontario	1.21	160.32	5,098.32

a From United States Geological Survey topographic maps.

GAGES ON OSWEGO RIVER.

The drainage directly tributary to Oswego river is 160 square miles. This area comprises chiefly moderately-rolling, cultivated upland, having a good depth of soil overlying the rock, which, as a rule, is visible only in the bed of the stream. A portion of the area is drained through lakes and marshes. The run-off from the direct drainage to Oswego river is moderate and the regimen differs but little from that resulting from the inflow of the two main tributaries — the Oneida and Seneca.

Gages for Determining Elevation of Water-surface on Oswego River.

LOCATION.	DISTANCE IN MILES.* From curved dam, Oswego.	DISTANCE IN MILES.* Station to station.	Usual time of reading gage.	Present type of gage.
Above Oswego curved dam..	0	0	8 a. m.....	Board with coppered staples.
Below High dam...........	1.1	1.1	8 a. m.....	Painted board scale.
Above High dam...........	.1	1.2	8 a. m.....	Reference point.
Below Minetto dam.........	2.3	3.5	6:30 a. m..	Chain and plumb-bob.
Above Minetto dam........	.1	3.6	6:30 a. m..	Chain and plumb-bob.
Below Braddock dam†......	3.2	6.8	9 a. m....	Chain and plumb-bob.
Above Braddock dam.......	.0	6.8	9 a. m....	Board with coppered staples.
Mouth of Waterhouse creek...	2.3	9.1	9 a. m....	Reference point.
Manhattan Villa...........	.7	9.8	9 a. m....	*a*Chain and plumb-bob.
Above lower Fulton dam....	.3	10.1	9 a. m....	Painted board.
Above Oswego Falls dam....	.8	10.9	10 a. m....	Reference point.
Mouth of Ox creek........	3.9	14.8	11 a. m....	Board with coppered staples.
Below Horseshoe dam.......	1.0	15.8	1 p. m....	Chain and plumb-bob.
Above Horseshoe dam.....	.2	16.0	1 p. m....	Chain and plumb-bob.
Hinmansville..............	.9	16.9	1 p. m....	Chain and plumb-bob.
Below Phoenix dam........	3.0	19.8	Noon......	Board with coppered staples.
Above Phoenix dam........	.1	20.0	Noon......	Board with coppered staples.

* Measured along course of stream on U. S. Geological Survey topographic map.
† Called also Battle Island dam.
a Discontinued.

OSWEGO RIVER ABOVE CURVED DAM, OSWEGO, N. Y.

A gage was erected above the State dam on Oswego river at Oswego, April 7, 1904, by this Department. The gage at present used is a ⅞-inch by 6-inch vertical board, graduated with coppered staples and brass figures, reading from zero to 9 feet. The elevation of the zero mark of the gage was 264.26 in 1906 and 264.23 in 1907 and 1908. The elevation of the crest of the curved dam is 264.9. Water is diverted to the Oswego canal and to the hydraulic power canals of the Oswego Canal Company at the right-hand end of the dam and to the Varick power canal at the left-hand side. The gage is attached to the down-stream side of the crib pier at the entrance to the Varick canal above the dam. It is read each morning by D. D. Tompkins.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River above Curved Dam, Oswego, N. Y.

DAY.	Jan.	F	c.
1903.			
1	270 43	26	.33
2	2 0 03	26	93
3	270 03	26	3
4	269 63	26	.13
5		26	63
6	269 63	26	.73
7	269 63	26	33
8	269 43	26	33
9	269 33	26	23
10	269 33	26	13
11	269 03	26	63
12	269 53	26	73
13	269 33	26	93
14	269 23	26	93
15	269 23	26	23
16	269 33	26	13
17	2 8 93	26	03
18	269 33	26	.93
19	269 63	26	.43
20	269 03	26	.43
21	269 03	26	.73
22	269 13	26	93
23	269 13	27	43
24	268 93	26	53
25	269 03	26	23
26	269 23	26	33
27	268 73	26	23
28	268 13	26	03
29	268 83	26	43
30	268 63		93
31	268 53		03

OSWEGO RIVER BELOW HIGH DAM, NEAR OSWEGO, N. Y.

High dam is the second dam above the mouth of the Oswego river and is located 1.1 miles above the curved dam. A gage was erected below this dam, April 7, 1904. The gage is a vertical board divided to feet and tenths by means of coppered staples with brass figures. It is attached to the left-hand face of a stone-filled timber crib, forming down-stream extension of the masonry abutment at the left-hand end of the dam. The zero mark on the gage is at elevation 266.07.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River below High Dam, near Oswego, N. Y.

DAY	Jan.	Feb.	March
1908.			
1	271 17	269 27	270 7
2	271 07	269 22	270 7
3	270 97	269 07	270 7
4	270 82	269 17	270 7
5	270 77	269 07	270 7
6	270 37	269 07	270 7
7	270 57	269 02	270 8
8	270 37	269 07	270 7
9	270 27	269 57	270 7
10	270 57	269 42	270 7
11	269 77	269 32	270 6
12	270 17	269 22	270 8
13	270 27	269 07	271 0
14	269 97	269 07	271 4
15	270 07	269 27	271 6
16	270 57	271 12	271 7
17	269 57	271 27	271 5
18	270 07	271 37	271 5
19	270 02	271 37	271 5
20	269 72	271 27	271 4
21	269 87	271 17	271 3
22	269 87	271 12	271 2
23	269 82	271 07	271 3
24	269 77	271 07	271 2
25	269 67	270 97	271 2
26	269 77	270 87	271 2
27	269 57	270 87	271 2
28	269 02	270 82	271 2
29	269 52	270 77	271 2
30	269 57		271 2
31	269 52		271 1

OSWEGO RIVER ABOVE HIGH DAM, NEAR OSWEGO, N. Y.

A record of the stage of the water above High dam has been kept since April 1, 1907. An effort was formerly made to determine the discharge from observations at this point, but owing to the undetermined leakage, this has been found impracticable. A description of the conditions may be found in Supplement to the Report of the State Engineer and Surveyor of New York for 1902, pages 91–96. Water is diverted to the Oswego canal on the right-hand bank, and for the power plants of the Oswego Water Works & Electric Light Company on the left-hand bank. Flashboards were formerly maintained on the crest of the dam in the summer season. In 1903 the crest was permanently raised by masonry. The elevation of water-surface is determined by measuring downward with a graduated rod from a reference point on the up-stream end of the left-hand abutment. The gages at High dam were read each morning by Samuel L. Purdy to January 31, 1909, and by Arthur Cowens after that date.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River above High Dam, near Oswego, N. Y.

DAY.	Jan.	Feb.	March.	April.	May	J	
1908.							
1 ..	286 47	284 47	285 52	286 87	286 22	[illegible]	17
2	286 47	284 22	285 57	286 82	286 27	[illegible]	07
3 ..	286 87	284 17	285 62	286 52	286 37	[illegible]	12
4	286 37	284 32	285 [illegible]	286 77	286 52	[illegible]	07
5	286 07	284 42	285 67	286 77	286 47	[illegible]	12
6	285 72	284 42	285 62	286 77	286 87	[illegible]	07
7	285 87	284 37	285 62	286 67	286 37	[illegible]	12
8	285 77	284 22	285 62	286 67	286 62	[illegible]	07
9	285 67	284 22	285 82	286 67	286 62	[illegible]	07
10	285 57	284 17	285 77	286 62	286 47	[illegible]	12
11	286 12	284 27	285 77	286 67	286 57	[illegible]	97
12	285 52	284 27	285 97	286 57	286 57	[illegible]	02
13	285 72	284 32	286 32	286 52	286 52	[illegible]	97
14	285 87	284 37	286 87	286 52	286 52	[illegible]	92
15	285 87	284 97	286 97	286 47	286 52	[illegible]	07
16	285 57	286 07	287 87	286 87	286 47	[illegible]	07
17	285 82	286 37	287 32	286 87	286 32	[illegible]	07
18	285 47	286 22	287 27	286 37	286 47	[illegible]	02
19	285 37	286 22	287 27	286 27	286 37	[illegible]	07
20	285 07	286 17	287 17	286 87	286 27	[illegible]	87
21	285 37	286 12	287 07	286 32	286 17	[illegible]	57
22	285 37	286 07	28[illegible] 97	286 27	286 12	[illegible]	87
23	285 32	286 12	287 07	286 27	286 02	[illegible]	77
24	285 22	286 07	287 07	286 22	285 77	[illegible]	82
25	284 67	285 97	28[illegible] 07	286 22	285 87	[illegible]	77
26	285 02	285 87	287 07	286 07	285 77	[illegible]	17
27	285 12	285 82	287 02	286 17	285 67	[illegible]	87
28	284 27	285 77	287 02	286 27	285 57	[illegible]	67
29	284 87	285 67	286 97	286 07	285 47	[illegible]	02
30 .	284 57		286 92	286 12	285 37	[illegible]	77
31 ..	284 67		286 87		285 32		97

OSWEGO RIVER BELOW DAM AT MINETTO, N. Y.

The dam at Minetto is located 3.5 miles up-stream from Oswego. A gage was erected by this Department, April 18, 1904, for the purpose of determining the water-elevation below the dam. During the year 1907 a weight-and-chain gage was used, the box and scale being attached horizontally to the coping of the river wall at the right-hand end of the dam. The standard datum for this gage is at elevation 286.61, the chain length being 16.00. The gage is read each morning by Roy L. Smith.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River below Dam at Minetto, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	292.81	291.01	294.61	293.11	292.41	291.71	290.41	290.01	289.61	289.51	289.61	290.01
2	292.91	293.61	294.81	293.11	292.61	291.71	290.21	289.91	289.71	289.51	289.81	290.01
3	292.81	295.11	294.71	293.11	292.71	291.61	290.01	290.01	289.81	289.51	289.81	290.11
4	292.71	296.81	294.61	293.11	292.81	291.51	290.11	290.01	289.71	289.31	289.81	290.11
5	292.61	297.21	294.61	293.01	292.81	291.41	290.31	290.01	289.71	289.51	289.91	290.21
6	292.61	296.81	294.41	293.11	292.91	291.31	290.51	290.01	289.51	289.51	289.91	290.01
7	292.71	296.71	294.11	293.01	292.91	291.11	290.41	290.01	289.61	289.51	289.91	290.21
8	292.81	296.71	293.91	292.91	292.81	291.11	290.31	290.01	289.61	289.51	289.71	290.11
9	292.31	296.51	293.91	292.91	292.81	291.01	290.31	289.91	289.51	289.51	289.81	290.11
10	292.11	296.81	293.31	292.81	292.71	291.01	290.21	290.01	289.41	289.51	289.81	290.01
11	292.01	297.11	293.11	292.81	292.81	290.91	290.21	289.91	289.31	289.31	289.81	290.01
12	291.91	296.31	292.61	292.71	292.81	290.81	290.01	289.91	289.21	289.51	289.91	290.01
13	292.01	296.11	292.61	292.81	292.71	290.81	292.21	289.81	289.41	289.61	289.91	289.81
14	292.01	295.91	293.11	292.81	292.71	290.71	290.11	289.81	289.61	289.61	289.91	289.91
15	292.01	296.81	293.31	292.71	292.61	291.41	290.11	289.81	289.61	289.61	289.81	289.81
16	291.91	297.81	293.61	292.71	292.61	291.61	290.11	289.71	289.61	289.61	290.01	289.71
17	291.91	297.51	293.51	292.61	292.51	291.71	290.11	289.81	289.51	289.61	290.01	2 9.71
18	291.81	297.21	293.31	292.61	292.61	291.51	290.21	289.81	289.41	289.41	290.01	289.61
19	291.71	297.11	293.21	292.61	292.61	291.41	290.31	289.71	289.41	289.61	290.11	289.51
20	291.71	297.01	293.21	292.71	292.51	291.31	290.41	289.71	289.21	289.61	290.11	289.51
21	291.61	296.91	293.21	292.61	292.41	291.11	290.41	289.71	289.41	289.61	290.11	289.51
22	291.71	296.71	293.21	292.51	292.31	291.21	291.41	289.71	289.41	289.61	289.91	289.61
23	291.71	296.51	293.31	292.51	292.21	291.11	290.51	289.61	289.41	289.61	290.11	289.61
24	291.71	296.41	293.31	292.61	292.01	291.01	290.51	289.71	289.41	289.61	290.11	289.71
25	291.71	296.11	293.31	292.61	292.11	290.91	290.51	289.71	289.41	289.41	290.11	289.81
26	291.41	295.91	293.31	292.41	292.01	290.81	290.41	289.71	282.41	289.61	290.01	289.81
27	291.11	295.61	293.31	292.61	292.01	290.71	290.51	289.61	289.31	289.71	290.01	289.71
28	290.81	295.31	293.21	292.51	291.91	290.61	290.41	289.61	289.51	289.71	290.01	289.91
29	290.81	295.01	293.21	292.41	291.81	290.61	290.[illegible]1	289.61	289.51	289.81	289.81	290.01
30	290.81	......	29[illegible].21	292.[illegible]1	291.81	290.51	290.21	289.51	289.51	289.81	289.91	290.01
31	290.91	......	293.11	......	291.81	......	290.11	289.61	......	289.81	......	290.01

OSWEGO RIVER ABOVE DAM AT MINETTO, N. Y.

The gage used during 1908 has been of the weight-and-chain type, the box containing the gage scale being attached horizontally to the coping of the right-hand abutment, a few feet up-stream from the crest of the dam. The standard datum for this gage is 292.18, the chain length being 9.1 feet. The gage was established April 18, 1904, and is read each morning by Roy L. Smith. Water is diverted to the Oswego canal at the right-hand side and to the Minetto Shade Cloth Company's race at the left-hand side of the stream.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River above Dam at Minetto, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	301.58	300.18	300.78	301.68	301.18	200.38	299.58	299.28	299.18	299.08	298.98	299.38
2	301.48	*a*	300.88	301.68	301.18	300.38	299.48	299.18	299.28	299.08	299.18	299.48
3	301.38	*a*	300.88	301.58	301.28	300.38	299.28	299.28	299.28	299.08	299.18	299.48
4	301.38	*a*	300.78	301.58	301.38	300.38	299.38	299.28	299.18	298.88	299.18	299.48
5	301.28	*a*	300.78	301.58	301.48	300.38	299.48	299.28	299.08	299.08	299.28	299.48
6	301.28	*a*	300.78	301.68	301.48	300.28	299.68	299.18	298.98	298.98	299.28	299.28
7	301.18	*a*	300.78	301.68	301.48	300.18	299.68	299.18	299.18	298.98	299.28	299.48
8	301.08	*a*	300.78	301.58	301.48	300.18	299.68	299.18	299.18	298.98	299.08	299.38
9	300.98	*a*	300.88	301.48	301.38	300.08	299.58	299.38	299.08	298.98	299.18	299.28
10	300.88	*a*	300.78	301.48	301.28	299.98	299.58	299.48	298.98	298.98	299.18	299.18
11	300.78	*a*	300.78	301.38	301.38	299.88	299.58	299.48	298.88	298.88	299.18	299.18
12	300.88	*a*	300.78	301.28	301.38	299.78	299.38	299.38	298.78	298.98	299.28	299.08
13	300.78	*a*	301.18	301.38	301.38	299.78	299.48	299.38	298.98	299.08	299.28	298.88
14	300.78	299.78	301.78	301.48	301.38	299.68	299.38	299.28	299.18	299.08	299.28	299.08
15	300.98	300.68	301.88	301.38	301.28	300.38	299.28	299.28	299.18	299.08	299.18	299.08
16	300.88	301.08	301.98	301.38	301.28	300.48	299.18	299.28	299.08	299.08	299.38	299.08
17	300.88	301.28	301.88	301.28	301.18	300.58	299.18	299.38	299.08	299.08	299.38	299.08
18	300.78	301.18	301.78	301.28	301.28	300.48	299.38	299.38	298.98	298.98	299.38	299.08
19	300.68	301.18	301.78	301.28	301.28	300.28	299.58	299.28	298.98	299.08	299.38	299.08
20	300.68	301.18	301.78	301.38	301.18	300.28	299.68	299.28	298.78	299.08	299.38	298.88
21	300.58	301.18	301.78	301.28	301.18	300.18	299.68	299.28	298.98	299.08	299.38	299.08
22	300.58	301.18	301.78	301.18	301.08	300.28	299.68	299.28	298.98	299.08	299.18	298.98
23	300.58	300.98	301.88	301.18	300.98	300.18	299.78	299.18	298.98	299.08	299.38	298.98
24	300.58	301.18	301.88	301.18	300.88	300.08	299.78	299.28	298.98	299.08	299.38	298.98
25	300.58	301.08	301.88	301.18	300.98	299.98	299.78	299.28	298.98	298.98	299.38	299.08
26	300.38	300.98	301.88	301.08	300.88	299.88	299.68	299.28	298.88	299.08	299.38	299.08
27	300.18	300.98	301.88	301.28	300.78	299.88	299.78	299.18	298.68	299.18	299.38	298.98
28	300.08	300.88	301.78	301.18	300.68	299.78	299.68	299.18	298.88	299.18	299.38	299.18
29	299.98	300.78	301.68	301.08	300.58	299.78	299.58	299.18	298.98	299.18	299.18	299.18
30	299.98	.....	301.78	301.08	300.58	299.68	299.48	299.08	298.98	299.18	299.38	299.18
31	300.08	.....	301.68	......	300.58	.....	299.38	299.18	......	299.18	......	299.18

a No record.

OSWEGO RIVER AT BATTLE ISLAND.

A gage was established September 14, 1900, on the Oswego river opposite Battle Island. This station was maintained by the United States Geological Survey in coöperation with this Department. The results may be found in the Supplement of the Report of the State Engineer and Surveyor of New York for 1902, pages 86–91; for 1903, pages 41–42, and for 1904, pages 512–513. The gage readings were discontinued in 1905. On May 25, 1907, a gage was erected by this Department on the right-hand bank of the Oswego river opposite Battle Island and directly across the stream from the former gage. Readings of this gage have been taken by Smith Sharp. The zero of the gage is at elevation 302.61. The new gage consists of a vertical board, graduated to feet and tenths.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River at Battle Island

DAY.	Jan.	Feb.	March.	April.	May.	June	July.	Aug.	Sept.	Oct.	Nov	Dec.
1908.												
1	306 02	303 22	305 86	306 96	305 71	304 01	302 01	a	300 11	299 71	299 91	300 61
2	306 02	302 62	305 66	306 66	305 61	303 71	301 71	300 91	299 91	299 71	300 31	300 51
3	305 82	302 82	305 56	306 46	305 81	303 71	301 61	300 91	299 81	299 71	300 41	300 41
4	305 92	302 82	305 66	306 56	305 91	303 51	301 31	301 91	299 61	299 61	300 31	300 41
5	304 92	302 72	305 56	306 26	305 91	303 31	301 21	301 21	300 21	299 91	300 31	300 31
6	305 32	302 72	305 46	306 46	305 91	303 21	301 31	301 21	299 41	300 01	300 21	300 11
7	305 82	302 72	305 46	306 56	305 91	302 71	301 31	301 21	299 91	300 11	300 11	300 61
8	305 22	302 72	305 36	306 46	306 11	303 11	301 41	301 01	299 71	300 21	299 91	300 51
9	305 02	303 92	305 66	306 46	306 01	302 81	301 31	300 21	299 81	300 21	300 11	300 41
10	304 82	304 52	305 36	306 46	305 81	302 71	301 21	301 41	299 81	299 61	300 31	300 41
11	304 82	304 52	305 16	306 46	305 91	302 51	301 11	300 71	300 21	299 61	300 31	300 41
12	304 72	304 22	305 36	305 96	305 81	302 41	301 01	300 71	300 21	300 21	300 31	300 41
13	305 12	303 92	306 06	306 06	305 81	302 31	301 11	300 71	299 41	300 01	300 31	300 11
14	304 82	303 72	306 56	306 06	305 81	302 21	301 0.	300 61	300 11	299 91	300 21	300 41
15	304 92	304 22	307 06	305 96	305 81	304 41	300 91	300 61	300 11	299 91	300 01	300 61
16	304 62	304 82	307 36	305 96	305 81	303 91	a	300 21	299 81	299 81	300 81	300 51
17	304 32	305 22	307 36	305 86	305 71	303 51	300 81	300 71	299 81	299 71	300 51	300 51
18	304 82	305 62	307 16	305 76	305 71	303 21	301 21	300 91	299 71	299 51	300 51	300 41
19	304 52	306 42	306 36	305 66	305 51	303 31	301 61	300 71	299 81	299 91	300 51	300 31
20	304 82	306 22	307 06	305 76	305 41	303 21	302 01	300 51	299 41	299 91	300 51	299 41
21	304 52	306 02	306 96	305 86	305 31	302 81	302 01	300 81	300 61	299 71	300 51	299 81
22	304 52	306 02	306 86	305 86	305 21	303 01	303 01	300 41	299 71	299 71	300 11	300 11
23	304 52	306 32	307 06	305 76	305 11	302 81	302 71	299 91	299 71	299 71	300 41	00 11
24	304 32	306 42	306 96	305 66	304 81	302 81	302 51	300 41	299 81	299 71	300 41	300 61
25	304 22	306 22	306 96	305 66	304 71	302 41	302 51	300 51	299 71	299 61	300 21	299 81
26	303 62	305 92	306 86	305 26	304 71	302 51	302 31	300 41	299 71	300 11	300 11	299 51
27	303 92	305 62	306 96	305 41	304 41	302 31	302 41	300 61	299 51	300 21	300 21	299 81
28	304 12	305 42	306 95	305 51	304 31	302 11	302 11	300 41	299 71	300 21	300 31	299 91
29	304 12	305 42	306 86	305 41	304 11	302 31	302 01	300 51	299 81	300 21	300 11	300 01
30	303 42		306 96	305 31	304 11	302 21	301 91	300 31	299 81	300 21	300 31	300 11
31	303 22		306 86		303 81		301 61	300 41		299 51		300 11

a No record

Mean Daily Discharge, Second feet of Oswego River at Battle Island

DAY	Jan.	Feb.	M		Nov.	Dec
1908.						
1	a	a	11	90	2,470	3,270
2			12	90	2,910	3,140
3			12	90	3,020	3,020
4			12	90	2,910	3,020
5			12	70	2,910	2,910
6			12	90	2,800	2,690
7			12	00	2,690	3,270
8			11	90	2,470	3,140
9			12	00	2,690	3,020
10			11	00	2,910	3,020
11			11	90	2,910	3,020
12			11	00	2,910	3,020
13			14	80	2,910	2,690
14			14	70	2,800	3,020
15			15	70	2,580	3,270
16			16	00	3,530	3,140
17			16	80	3,140	3,140
18			15	00	3,140	3,020
19			14	70	3,140	2,910
20			15	70	3,140	
21			15	00	3,140	2,380
22			15	80	2,690	2,690
23			15	00	3,020	2,690
24			15	90	3,020	2,580
25			15	80	2,800	2,380
26			15	00	2,690	2,090
27			15	00	2,800	2,380
28			15	00	2,910	2,470
29			15	0	2,690	2,580
30			15	0	2,910	2,690
31			15	0		2,690
Mean			14	2	2,888	2,845

a Ice obstruction

Monthly Discharge of Oswego River at Battle Island.
[Drainage area, 4,900 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	a				
February	a				
March	16,400	11,498	14,172	2.89	3.32
April	15,496	11,712	13,455	2.75	3.08
May	13,580	8,490	11,975	2.44	2.81
June	9,915	5,470	7,062	1.44	1.61
July	7,105	3,530	4,816	0.983	1.13
August	5,130	2,470	3,300	0.674	0.775
September	2,800	2,000	2,388	0.487	0.545
October	2,800	2,090	2,452	0.501	0.576
November	3,530	2,470	2,888	0.589	0.660
December	3,270	2,090	2,845	0.581	0.668

a Ice obstruction.

OSWEGO RIVER BELOW BATTLE ISLAND DAM.

A chain-and-weight gage was erected on the down-stream end of the right-hand abutment of the Battle Island, or Braddock's dam, April 11, 1904, by H. U. Lyon, of this Department. The gage reads decimally from zero to 9 feet, the standard elevation of the water-surface, when the gage reads zero, being 301.00, and the chain length being 11.78 feet. The gage is read each morning by Smith Sharp.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River below Battle Island Dam.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	306.30	304.30	305.60	307.10	305.80	?04.80	304.10	306.00	303.50	303.30	303.20	303.40
2	306.30	304.60	305.90	306.90	306.10	304.80	304.10	304.00	303.50	303.10	303.40	303.40
3	306.10	304.80	306.00	306.70	306.10	304.70	304.00	304.20	303.40	303.10	303.40	303.40
4	306.20	304.30	305.90	306.80	306.50	304.60	304.00	304.10	303.40	303.00	303.30	303.50
5	305.20	304.20	305.80	306.60	306.30	304.70	304.00	304.00	303.40	303.50	303.30	303.50
6	305.50	304.20	305.70	306.60	306.20	304.70	304.20	304.00	303.00	303.40	303.30	303.30
7	305.50	304.20	305.70	306.60	306.20	304.30	304.20	304.00	303.50	303.20	303.30	303.50
8	305.50	304.10	305.50	306.60	306.50	304.50	304.10	304.00	303.30	303.20	303.20	303.30
9	305.40	304.80	305.70	306.60	306.40	304.50	304.10	303.50	303.50	303.20	303.60	303.30
10	305.30	305.00	305.70	306.60	306.20	304.30	304.10	303.80	303.50	303.20	303.60	303.30
11	305.30	304.60	305.50	306.60	306.60	304.40	304.00	303.80	303.50	303.20	303.60	303.40
12	305.10	304.30	305.60	306.20	306.40	304.30	303.70	303.70	303.50	303.30	303.50	303.40
13	305.50	304.20	306.20	306.50	306.30	304.30	304.20	303.80	303.00	303.20	303.50	303 20
14	305.20	304.40	307.00	306.40	306.40	304.10	304.00	303.70	303.50	303.20	303.50	303.50
15	305.30	305.00	307.00	306.30	306.30	305.50	304.00	303.70	303.50	303.20	303.50	303.40
16	305.00	306.50	307.80	306.30	306.20	305.20	303.90	303.70	303.50	503.20	303.70	303.50
17	304.70	306.70	307.50	306.20	306.00	304.90	303.90	303.90	303.50	303.20	303.50	303.50
18	305.20	306.90	307.50	306.20	306.30	304.80	303.90	303.30	303.30	303.10	303.40	303.40
19	.04.90	307.20	307.40	306.10	306.00	304.80	304.20	303.50	303.30	303.40	303.40	303.30
20	305.20	306.90	307.20	306.10	305.90	304.80	304.30	303.50	303.10	303.30	303.40	303.10
21	304.90	306.80	307.10	306.00	305.80	304.40	304.50	303.50	303.60	303.20	303.40	303.30
22	304.90	306.80	306.90	306.00	305.80	304.70	304.70	303.60	303.20	303.30	303.30	303.30
23	305.00	306.60	307.20	306.00	305.60	304.50	304.50	303.40	303.10	303.40	303.50	303.30
24	304.70	306.70	307.20	306.00	305.20	304.40	304.50	303.60	303.10	303.20	303.40	303.30
25	304.70	306.60	307.20	306.00	305.30	304.20	304.50	303.60	303.10	303.20	303.40	303.00
26	304 40	306.40	307.10	305.50	305.20	304.30	304.60	303.50	303.10	303.40	303.40	303.20
27	304.30	306.10	307.10	305.90	305.10	304.20	304.40	303.60	303.10	303.40	303.40	303.10
28	304.20	305 90	307.10	305.90	305.00	304.10	304.20	303.50	303.60	303.40	303.40	303.30
29	304.20	305.90	306.90	305.80	304.90	304.30	304.20	303.50	303.30	303.40	303.30	303.20
30	304.40	.....	307.10	305.70	304 90	304.20	304.20	303.40	303.80	303.40	303.50	.03.10
31	304.30	.....	307.10	.....	304.60	.....	304.10	303.60	.....	303.40	.....	303.20

OSWEGO RIVER ABOVE BATTLE ISLAND DAM.

This gage is attached to the up-stream vertical face of the right-hand abutment of the dam. It was established April 11, 1904, by H. U. Lyon, and readings are taken each morning by Smith Sharp. The gage consists of a vertical board, subdivided to feet and tenths by coppered staples, and reads from zero to 9 feet. Water is diverted to supply the Oswego canal at the right-hand side of the stream and to the raceway of a large wood pulp mill at the left-hand side. The elevation of the zero mark of the crest gage is 306.14. The crest of the dam is at elevation about 307.00

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River above Battle Island Dam.

DAY	Jan	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	311.73	310.30	311.00	312.20	311.70	310.90	310.30	310.00	309.50	309.30	309.40	309.60
2	311.73	310.00	311.20	312.00	311.70	310.90	310.20	309.90	309.50	309.30	309.50	309.60
3	311.73	310.20	311.30	311.90	311.70	311.00	310.10	310.10	309.40	309.30	309.50	309.60
4	311.73	310.30	311.20	311.70	311.90	310.90	310.00	310.00	309.50	309.00	309.50	309.70
5	311.00	310.20	311.20	311.80	311.80	310.80	310.00	309.90	309.50	309.60	309.50	309.70
6	311.50	311.20	311.30	311.90	311.80	310.80	310.40	309.80	309.10	309.50	309.50	309.50
7	311.50	310.10	311.30	311.90	311.80	310.60	310.40	309.80	309.50	309.40	309.50	309.70
8	311.50	310.10	311.10	311.90	312.00	310.70	310.10	309.80	309.30	309.40	309.40	309.50
9	311.30	310.30	311.30	312.00	311.90	310.70	310.00	309.50	309.50	309.30	309.70	309.50
10	311.00	310.60	311.30	311.90	311.80	310.50	310.00	309.60	309.50	309.30	309.70	309.50
11	311.00	310.60	311.30	311.90	312.00	310.50	310.00	309.60	309.50	309.40	309.70	309.60
12	310.60	310.30	311.40	311.80	311.90	310.50	309.60	309.50	309.50	309.50	309.70	309.60
13	311.20	310.[illegible]	311.80	311.90	311.90	310.50	310.20	309.60	309.10	309.50	309.70	309.40
14	311.00	310.40	312.00	311.90	311.80	310.30	310.10	309.70	309.50	309.50	309.70	309.60
15	311.00	310.70	312.10	311.80	311.80	311.[illegible]0	310.1[illegible]	309.[illegible]0	309.50	309.50	309.50	309.60
16	310.80	311.40	312.50	311.80	311.80	311.20	309.90	309.50	309.50	[illegible]09.50	309.70	309.60
17	310.70	311.50	312.40	311.70	311.70	311.00	309.90	309.80	309.50	309.50	309.60	309.60
18	311.00	311.60	312.30	311.70	311.80	310.90	309.80	309.60	309.[illegible]0	309.30	309.50	309.50
19	310.90	311.80	312.30	311.70	311.70	310.70	310.00	309.40	309.[illegible]0	309.50	309.50	309.40
20	311.10	311.60	312.20	311.70	311.60	310.70	310.20	309.40	309.10	309.50	309.60	309.30
21	310.90	311.50	312.10	311.70	311.60	310.60	310.30	309.60	309.50	309.40	309.60	309.40
22	310.90	311.50	312.00	311.60	311.50	310.80	310.50	309.60	309.20	309.40	309.20	309.40
23	311.10	311.40	312.20	311.60	311.50	310.60	310.30	309.50	309.20	309.40	309.60	309.50
24	310.80	311.50	312.20	311.60	311.30	310.60	310.30	309.50	309.20	309.40	309.70	309.50
25	310.[illegible]0	311.40	312.30	311.60	311.50	310.40	310.30	309.40	309.20	309.40	309.60	309.20
26	310.60	311.50	312.20	311.50	311.20	310.40	310.50	309.50	309.20	309.50	309.60	309.30
27	310.70	311.50	312.20	311.60	311.30	3[illegible]0.40	310.30	[illegible].50	309.20	309.50	309.60	309.30
29	310.60	311.30	312.20	311.60	311.10	310.10	310.10	309.40	309.70	309.50	309.60	309.50
29	310.60	311.30	312.10	311.60	311.00	310.40	310.10	309.40	309.40	309.50	309.50	309.50
30	310.40	.....	312.20	311.60	311.00	310.40	310.10	309.40	309.40	309.50	309.70	309.50
31	310.30	.....	312.20	.....	310.90	....	310.00	309.70	.....	309.50	.....	309.40

OSWEGO RIVER AT MOUTH OF WATERHOUSE CREEK, FULTON, N. Y.

Waterhouse creek, sometimes incorrectly called Black creek, enters the Oswego river in the north, or lower portion of Fulton. A record of the stage of Waterhouse creek has been kept since April 9, 1904, by this Department. The stage of the water is determined by measuring down-stream from a reference point on the outer corner of a square gray stone in the west end of the north abutment of the North First street bridge, crossing Waterhouse creek between the Oswego river and the Oswego canal. The elevation of the reference point is 315.00.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River at Mouth of Waterhouse Creek, Fulton, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	312.02	312.30	312.70	312.60	311.90	311.40	310.30	310.00	309.60	309.25	309.20	309.65
2	312.00	312.30	312.85	312.55	311.95	311.25	310.30	309.90	309.50	309.25	309.50	309.60
3	312.05	312.20	313.00	312.55	312.00	311.20	310.25	310.10	309.50	309.25	309.40	309.60
4	312.02	312.65	312.80	312.50	312.10	311.10	310.20	309.90	309.50	309.20	309.40	309.60
5	311.80	312.95	312.80	312.40	312.10	311.00	310.20	309.90	309.60	309.40	309.40	309.50
6	311.70	312.90	312.65	312.50	312.00	310.95	310.30	309.90	309.10	309.40	309.40	309.40
7	311.70	312.85	312.50	312.40	312.00	310.85	310.20	309.85	309.30	309.35	309.30	309.75
8	311.65	312.78	312.10	312.30	312.10	310.95	310.20	309.80	309.40	309.35	309.30	309.60
9	311.85	312.82	312.20	312.50	312.20	310.75	310.15	309.75	309.25	309.30	309.70	309.50
10	312.00	312.60	312.15	312.30	312.20	310.75	310.[illegible]0	[illegible]9.90	309.55	309.30	309.60	309.40
11	312.30	312.50	311.90	312.40	312.20	310.70	310.00	309.80	309.50	309.25	309.60	309.40
12	312.35	312.40	311.90	312.30	312.15	310.60	310.00	309.70	309.55	309.40	309.60	309.35
13	311.95	312.60	312.05	312.30	312.15	310.50	310.10	309.70	309.50	309.35	309.55	309.30
14	311.60	312.70	312.55	312.25	312.20	310.30	309.90	309.70	309.65	309.30	309.55	309.65
15	311.92	313.45	312.65	312.15	312.20	311.70	309.85	309.60	309.60	309.25	309.50	309.60
16	311.70	313.60	312.95	312.15	312.15	311.45	309.80	309.65	309.55	309.25	309.70	309.5[illegible]
17	311.65	313.80	312.90	312.10	312.[illegible]0	311.30	309.70	309.90	309.50	309.20	309.60	309.45
18	311.90	313.90	312.80	312.10	312.25	311.15	309.80	309.70	309.30	309.[illegible]0	309.50	309.40
19	311.85	313.80	312.75	312.10	312.20	311.05	310.20	309.40	309.40	309.40	309.50	509.40
20	311.80	313.75	312.70	312.15	312.05	311.00	310.20	309.60	309.30	309.30	309.50	309.10
21	311.80	313.70	312.65	312.15	312.05	310.85	310.10	309.60	309.50	309.25	309.45	309.30
22	311.70	313.65	312.55	312.10	311.90	310.95	310.55	309.60	309.25	309.25	309.40	309.35
23	311.80	313.60	312.75	312.05	311.90	310.85	310.50	309.50	309.20	309.20	309.70	309.30
24	311.80	313.55	312.80	312.00	311.90	310.70	310.45	309.60	309.15	309 20	309.65	309.35
25	311.40	313.40	312.80	311.95	311.80	310.60	310.40	309.60	309.20	309.15	309.60	309.30
26	311.7	313.30	312.70	311.95	311.65	310.50	310.30	309.55	307.20	309.50	309.40	309.25
27	311.75	313.20	312.70	311.95	311.50	310.50	310.50	309.50	309.15	309.60	309.50	309.20
28	311.70	312.95	312.70	312.00	311.50	310.3[illegible]	31[illegible].40	309.50	309.40	309.35	309.40	309.40
29	311.75	312.80	312.65	311.90	311.45	310.60	310.20	309.50	309.30	309.80	309.30	309.40
30	311.85	......	312.65	311.90	311.40	310.40	310.10	309.40	309.25	309.25	309.70	309.30
31	312.30	......	312.60	......	311.20	......	310.10	309.50	......	309.20	......	309.35

THE OSWEGO RIVER ABOVE LOWER FULTON DAM.

The elevation of the water-surface at a point above the Lower Fulton dam is determined each morning by this Department. A vertical board gage, reading to feet and tenths, is attached to the up-stream, center angle of the upper gates of the lower river lock. The gage is located on the right-hand bank of the stream, a short distance above the dam, and observations have been taken since April 9, 1904. During 1908 the readings have been taken by measuring down from a reference point on the gage at elevation 339.00.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River at Mouth of Ox Creek.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	351.56	352.46	352.41	352.41	351.91	350.61	348.91	348.31	348.61	348.61	349.11	349.01
2	351.56	351.96	352.31	352.31	351.91	350.51	348.71	349.21	348.81	348.61	348.91	348.91
3	351.56	351.56	352.31	352.21	352.21	350.31	348.71	348.31	348.61	348.61	348.91	348.91
4	351.46	351.56	352.31	352.11	352.01	350.21	349.41	348.01	348.61	348.81	348.81	348.81
5	351.66	351.66	352.11	352.21	352.01	349.91	349.21	348.01	348.61	3 8.71	348.81	348.91
6	351.36	351.46	351.81	352.11	351.81	349.91	348.61	348.01	348.91	348.71	348.71	349.11
7	351.26	351.36	351.61	352.01	351.91	350.31	348.41	348.11	349.01	348.71	348.61	349.01
8	350.86	351.36	351.61	352.01	352.11	349.91	348.41	347.91	348.61	348.61	348.91	34 .01
9	350.86	351.56	351.11	352.01	352.11	34 .61	348.51	348.61	348.51	348.51	349.01	348.91
10	350.86	351.56	351.11	352.01	352.21	349.51	348.41	348.01	348.51	348.61	348.71	348.91
11	351.26	351. 6	351.01	352.11	352.11	349.51	348.41	347.91	348.51	349.01	348.81	348.81
12	351.16	351.36	351.21	352.11	352.11	349.41	349.01	347.91	348.61	348.71	348.81	348.81
13	350.76	351.56	351.71	352.01	352.01	349.41	348.41	347.91	348.71	348.81	348.91	348.81
14	351.06	351.56	352.31	351.91	352.01	349.91	348.11	347.91	348.61	348.61	348.91	348.91
15	351.56	352.86	352.71	351.91	352.01	351.11	347.91	348.01	348.61	348.41	349.21	348.91
16	351.06	35 .86	352.91	351.71	351.91	350.91	347.81	348.61	348.41	348.61	349.21	348.81
17	351.96	353.96	352.81	351.71	352.11	50.51	347.91	348.01	348.41	348.61	348.91	348.81
18	352.76	353.76	352.71	351.81	351.71	350.41	348.01	347.81	348.41	348.91	348.81	348.81
19	352.46	353.66	352.71	351.91	351.61	350.21	349.61	348.41	348.41	348.81	348.91	348.71
20	352.16	353.56	352.61	351.81	351.61	50.21	349.11	348.81	348.91	348.71	348.81	348.31
21	351.66	353.56	352.51	351.81	351.61	350.41	349.11	348.71	348.61	348.61	348.81	348.61
22	350.76	353.36	352.61	351.71	351.51	350.01	349.61	348.71	348.61	348.61	348.91	348.71
23	350.36	353.36	352.51	351.71	351.51	349.61	349.51	348.91	348.41	348.51	349.01	348.71
24	350.86	353.16	352.51	351.71	351.21	349.61	349.41	348.71	348.31	348.51	348.91	348.61
25	352.86	353.16	352.51	351.81	351.01	349.71	349.31	348.71	348.31	348.91	348.81	348.41
26	351.76	353.16	352.41	351.91	351.01	349.41	349.81	348.71	348.31	348.81	348.91	348.71
27	351.26	352.76	352.41	351.61	350.91	349.31	349.11	348.71	349.51	348.71	349.01	348.51
28	353.76	352.56	352.41	351.71	350.81	349.81	349.01	348.71	348.41	348.61	348.81	3 8.61
29	353.66	352.46	352.51	351.61	350.71	349.31	348.91	348.71	348.61	348.81	349.01	348.61
30	352.96	......	352.41	351.61	350.71	349.01	348.81	348.91	348.61	348.81	348.91	348.31
31	352.66	......	352.41	...	350.81	..	348.61	348.71	......	348.81	......	348.11

OSWEGO RIVER BELOW SITE OF OLD HORSESHOE DAM.

The gage at this station was erected April 13, 1904. It is located on the right-hand bank of the Oswego river on a strip of land between the river and Oswego canal, a short distance below guard-lock No. 2. The readings are taken by means of a weight and chain in conjunction with a horizontal scale. The scale is attached at one end to a large buttonwood tree. The other end projects over the water. Readings are taken usually about noon each day by Frank M. Hughes.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River below Horseshoe Dam, near Phoenix, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	352.14	.....	.....	352.74	352.14	351.04	349.54	348.74	348.84	348.84	.....	349.04
2	352.04	.....	353.84	352.74	352.24	350.64	349.54	.....	348.84	348.94	349.14	349.04
3	351.94	.....	353.94	352.64	.....	350.54	349.54	348.84	348.94	348.84	348.94	349.04
4	351.78	.....	353.64	352.64	352.44	350.44	349.64	348.54	348.94	.....	348.94	.....
5	.....	.....	352.94	.....	352.24	350.34	.....	348.34	348.94	349.04	348.94	.....
6	351.68	.....	352.24	352.54	352.14	350.34	349.44	348.34	.....	348.74	349.04	.....
7	351.58	.....	352.04	352.44	352.44	.....	349.34	348.34	349.34	348.64	349.14	349.14
8	351.18	.....	.....	352.44	352.54	350.04	349.04	348.24	348.94	348.54	.....	348.94
9	351.08	.....	351.54	352.44	352.44	349.84	348.84	.....	348.54	348.54	349.14	348.94
10	351.18	.....	351.44	352.44	352.54	349.84	348.74	348.64	348.74	348.54	348.94	349.14
11	351.58	.....	351.34	352.44	352.54	349.84	348.64	348.1	348.84	.....	348.94	349.04
12	.....	353.84	351.64	.....	352.44	349.84	.....	348.14	348.84	348.94	348.94	348.94
13	351.08	353.84	352.34	352.44	352.44	349.84	.....	348.24	.....	348.84	348.94	.....
14	351.38	354.24	352.64	352.34	352.44	.....	.....	348.24	349.04	348.84	348.94	348.94
15	350.98	355.44	.....	.....	352.44	351.44	.....	348.24	348.94	348.84	.....	348.84
16	351.18	.....	353.34	352.14	352.34	351.04	.....	.....	348.94	348.84	349.24	348.84
17	351.78	355.84	353.04	352.14	.....	350.84	.....	348.34	348.84	348.94	349.04	348.84
18	352.78	355.74	353.04	352.14	352.24	350.64	348.44	348.04	348.84	.....	349.04	348.84
19	.....	355.64	353.04	.....	352.14	350.44	.....	.....	348.84	348.94	349.04	348.74
20	352.44	355.54	352.94	352.24	352.04	350.34	349.04	.....	.....	348.94	349.04	.....
21	351.84	355.54	352.94	352.24	351.94	.....	349.14	348.94	348.74	348.84	349.04	348.84
22	351.04	355.44	.....	352.14	351.94	350.24	349.84	348.94	348.54	348.84	.....	349.04
23	350.64	.....	352.94	352.14	351.84	349.94	349.84	.....	348.54	348.74	349.14	349.04
24	351.04	355.14	352.94	352.04	.....	349.84	349.74	348.94	348.54	348.54	349.04	348.94
25	353.04	354.94	352.84	352.04	351.64	349.94	349.64	348.94	348.54	.....	349.04	.....
26	.....	354.74	352.84	.....	351.44	349.84	.....	348.84	348.54	349.14	349.14	349.14
27	351.34	354.34	352.84	351.94	351.34	49.64	349.64	348.84	.....	348.94	349.14	.....
28	347.24	353.94	352.84	352.04	351.24	.....	249.24	348.84	348.84	348.74	349.04	348.54
29	346.84	353.94	.....	352.04	351.44	349.74	349.04	348.84	348.64	348.84	.....	348.74
30	350.64	.....	352.84	351.94	351.74	349.64	348.94	.....	348.74	348.94	349.14	348.64
31	354.64	.....	352.74	.....	.....	.....	348.84	349.04	.....	349.24	.....	348.64

NOTE.— No record on blank dates.

OSWEGO RIVER ABOVE SITE OF OLD HORSESHOE DAM.

A gage consisting of horizontal scale with weight and chain was erected a short distance above guard-lock No. 2, April 13, 1904. One end of the gage box projects horizontally over the water. The observer is Frank M. Hughes. Readings are usually taken about noon each day. The elevation of the datum of this gage, as well as that of the gage below, is determined from a bench-mark on guard-lock No. 2, having an elevation 360.91.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River above Horse-shoe Dam, near Phoenix, N. Y.

DAY	Jan.	Feb.	March	April.	May	June	v.	Dec.
1908.								
1	353 14	354 7		354 00	353 30	352 1		350 00
2	353 24		354 60	354 00	353 40	351 9	00	350 00
3	351 34	354 9	354 60	353 90		351 8	90	350 00
4	351 70	354 9	354 35	353 80	353 60	351 7	90	
5		354 9	353 69		353 40	351 6	80	
6	351 50	354 9		353 80	353 40	351 6	90	
7	351 50	354 9	352 94	353 70	353 50		90	350 00
8	351 00	354 9		353 70	353 70	351 4		350 00
9	351 00		352 60	353 70	353 70	351 2	90	349 90
10	350 90	354 80	352 60	353 70	353 70	351 2	90	349 90
11	351 40	354 70	352 52	353 70	353 70	351 1	90	349 90
12		354 50	352 94		353 60	351 0	90	349 80
13	350 90	354 40	353 44	353 60	353 40	351 0	90	
14	350 90		353 77	353 60	353 40		90	350 00
15	350 70	356 35			353 40	352 5		349 90
16	350 80		354 52	353 40	353 50	352 1	10	349 90
17	351 30	356 85	354 35	353 30		351 9	90	349 90
18	352 80	356 69	354 35	353 30	353 20	351 8	90	349 80
19		356 52	354 35		353 10	351 6	90	[illegible]
20	353 10	356 44	354 27	353 40	353 00	351 5	90	
21	352 70	356 60	354 20	353 40	353 10		90	349 90
22	352 00	356 44		353 30	353 00	351 4		350 00
23	351 80		354 20	353 30	352 90	351 2	00	350 00
24	352 10	356 02	354 20	353 20		351 1	00	349 90
25	353 40	355 85	354 10	353 20	352 70	351 1	00	
26		355 60	354 10		352 50	351 0	00	349 80
27	352 00	355 27	354 10	353 10	352 40	350 9	00	
28	354 40	354 85	354 10	353 10	352 30		00	350 00
29	354 80	354.77		353 10	352 30	350 9		349 80
30	355 20		354 10	353 10	352 40	350 7	10	349 90
31	354 90		354 00					349 90

NOTE. — No record on blank dates.

OSWEGO RIVER AT HINMANSVILLE BRIDGE.

This gage is located on the down-stream side of the left-hand span of the bridge crossing Oswego river at Hinmansville, N. Y. The gage is of the chain-and-weight type. The gage box is attached horizontally to the bridge floor outside the hand-railing and the scale is graduated from zero to nine feet. The standard datum of this gage is 348.643. Length of chain is 19.95 feet. The gage was established April 13, 1904, and is read each day about noon by Frank M. Hughes. The gage is located near lock No. 6 on the Oswego canal. A bench-mark on this lock is at elevation 361.69. Current-meter measurements were formerly made at this bridge, but as the stream is obstructed by grass at times and there are other objectionable features, these measurements have not been continued.

Current-meter Discharge Measurements of Oswego River at Hinmansville, N. Y.

DATE.	Hydrographer	Gage height	Width.	Area of section	Mean velocity	Discharge.
		Feet.	*Feet*	*Square feet.*	*Feet per second.*	*Second-feet*
1908.						
Oct. 2.	Clark and Overocker	1 55		1,440	1 50	2,161
Oct. 8.	Overocker and Niles	1 79	. . .	1,490	1 62	2,408
Oct. 9.	Overocker and Niles	1 82	.	1,490	1.64	2,444

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River at Hinmansville Bridge, Hinmansville, N. Y.

DAY	Jan	Feb.	March	April	May.	June.	July.	Aug.
1907 *								
1	353 90	356 10	354 60	355 30	354 47	352 87	351 67	351 1[illegible]
2	354 00	355 00	354 10	355 10	354 37	352 77	351 57	350 9[illegible]
3	354 30	354 60	354 10	354 80	354 37	352 77	351 57	350 9[illegible]
4	356 00	356 40	354 10	354 60	354 37	352 67	351 47	350 5[illegible]
5	355 90	356 30	354 20	354 80	354 27	352 67	351 77	350 9[illegible]
6	356 10	358 80	354 20	354 60	354 37	352 67	351 67	350 7[illegible]
7	356 10	360 00	354 10	354 50	354 17	352 67	351 47	350 6[illegible]
8	356 30	358 70	353 80	354 60	354 17	352 77	351 57	350 6[illegible]
9	356 30	357 30	353 50	354 40	354 07	352 77	351 47	350 5[illegible]
10	356 20	356 10	353 20	354 20	353 87	352 77	351 47	350 6[illegible]
11	356 10	355 60	353 20	354 20	353 87	352 77	351 37	350 4[illegible]
12	356 10	355 80	352 80	354 20	353 97	352 57	351 47	350 6[illegible]
13	356 00	355 80	352 70	354 10	353 87	352 47	351 37	350 6[illegible]
14	355 80	355 70	352 70	353 90	353 87	352 37	351 17	350 4[illegible]
15	355 80	355 30	353 00	353 90	353 77	352 27	351 47	350 5[illegible]
16	356 00	355 20	353 20	353 90	353 67	352 17	351 17	350 4[illegible]
17	355 90	354 70	353 80	353 80	353 67	352 27	351 17	350 4[illegible]
18	355 75	354 60	354 00	353 60	353 57	352 07	351 17	349 8[illegible]
19	355 20	354 90	354 20	353 50	353 57	352 07	361 17	350 5[illegible]
20	355 20	354 60	354 10	353 30	353 47	351 97	351 07	350 4[illegible]
21	355 10	354 00	354 30	353 30	353 27	351 87	350 87	350 4[illegible]
22	355 10	354 80	354 40	353 20	353 17	351 77	351 17	350 2[illegible]
23	354 90	354 50	354 60	353 30	353 17	351 57	351 27	350 3[illegible]
24	355 50	354 50	354 90	353 40	353 07	351 77	351 27	350 3[illegible]
25	355 60	354 50	355 10	353 60	352 97	351 57	351 27	349 6[illegible]
26	356 50	355 00	355 20	354 10	353 27	351 57	351 37	350 1[illegible]
27	356 90	354 70	355 20	354 40	358 37	351 27	351 27	350 2[illegible]
28	356 60	354 80	355 50	354 40	352 97	351 37	351 17	350 2[illegible]
29	356 60		355 50	354 50	353 07	351 37	351 47	350 2[illegible]
30	356 40		355 40	354 50	352 97	351 27	361 17	350 2[illegible]
31	356 30		355 30		352 97		351 27	350 2[illegible]

* This table supersedes that appearing on p. 417 of the 1907 report, which was referred to incorrect datum.

a No record.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River at Hinmansville Bridge, Hinmansville, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	355.05	355.14	355.44	356.04	355.14	353.84	351.84	351.34	350.24	350.34	350.24	350.74
2	354.95	355.24	355.54	355.94	355.24	353.54	351.74	351.14	350.54	350.44	350.74	350.74
3	354.95	355.34	355.74	355.84	355.34	353.34	351.64	351.14	350.44	350.34	350.54	350.74
4	354.95	355.44	355.44	355.74	355.54	353.24	351.54	351.04	350.44	350.34	350.54	350.74
5	354.75	355.34	354.94	355.64	355.24	353.14	351.54	351.04	350.34	350.34	350.44	350.74
6	354.75	355.34	354.54	355.74	355.24	353.04	351.54	351.04	349.64	350.44	350.44	350.34
7	354.85	355.34	354.44	355.64	355.34	353.04	351.54	350.94	350.24	350.34	350.54	350.84
8	354.25	355.34	354.24	355.74	355.54	352.84	351.54	350.49	350.54	350.24	350.34	350.74
9	354.15	355.24	354.34	355.64	355.54	352.64	351.44	*a*	350.24	350.24	350.54	350.74
10	354.05	355.14	354.34	355.74	355.54	352.64	351.44	351.04	350.34	350.24	350.54	350.64
11	354.65	355.04	354.34	355.74	355.64	352.54	351.34	350.74	350.44	349.74	350.54	350.64
12	353.85	354.94	354.64	355.44	355.54	352.44	351.04	350.64	350.34	350.44	350.54	350.64
13	354.05	354.94	355.34	355.54	*a*	352.44	351.14	350.74	349.94	350.24	350.54	350.04
14	354.05	355.34	355.64	355.54	355.54	352.24	351.04	350.74	350.44	350.44	350.54	350.54
15	353.45	356.54	356.14	355.44	355.54	354.09	350.94	350.64	350.44	350.44	350.34	350.64
16	353.85	357.34	356.54	355.34	355.54	353.74	350.84	350.64	350.44	350.44	350.74	350.54
17	354.05	357.74	356.34	355.34	355.34	353.54	350.94	350.84	350.34	350.24	350.64	350.44
18	354.95	357.74	356.34	355.34	355.34	353.34	351.14	350.74	350.34	349.84	350.64	350.34
19	354.05	357.64	356.34	355.24	355.14	353.24	351.44	350.74	350.44	350.34	350.64	350.24
20	354.65	357.44	356.34	355.34	355.04	353.04	351.64	350.74	349.84	350.44	350.64	349.44
21	354.05	357.54	356.24	355.34	354.94	352.84	351.84	350.54	350.44	350.44	350.64	350.44
22	354.05	357.24	356.24	355.24	354.84	352.94	352.24	350.64	350.44	350.34	350.34	350.44
23	353.55	357.14	356.34	355.24	354.74	352.64	352.14	350.24	350.44	350.44	350.74	350.64
24	353.75	356.94	356.24	355.14	354.54	352.54	352.14	350.64	350.34	350.14	350.74	350.64
25	354.55	356.74	356.24	355.14	354.54	352.34	352.04	350.64	350.24	350.04	350.74	349.34
26	353.65	356.44	356.14	355.04	354.24	352.24	352.04	350.54	350.24	350.54	350.64	350.44
27	353.55	356.14	356.14	355.04	354.04	352.14	352.04	350.44	349.44	350.54	350.74	349.84
28	354.95	355.84	356.14	355.04	353.94	352.14	351.84	350.34	350.34	350.54	350.64	350.54
29	355.25	355.74	356.24	355.04	353.84	352.14	351.64	350.34	350.34	350.54	350.34	350.54
30	355.55	.....	356.24	354.94	353.74	351.94	351.54	350.14	350.24	350.64	350.94	350.94
31	355.35	.....	356.14	.....	353.64	.....	351.44	350.44	.....	350.64	.....	350.94

a No record.

OSWEGO RIVER BELOW PHOENIX DAM.

A gage was established April 16, 1904, by this Department and readings are taken about noon each day by George Archambeau. The gage at present used is a vertical scale divided decimally by coppered staples from zero to nine feet. It is attached to the down-stream side of the Pendergast Mill on the right-hand bank of the river. The gage zero is at elevation 352.95. The gage is located 255 feet down-stream from the right-hand end of the dam.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River below Dam at Phoenix, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	358.0	358.9	358.6	359.0	357.7	356.0	353.7	353.4	353.2	353.1	353.4	353.2
2	358.5	360.1	358.4	359.0	357.9	355.8	353.7	353.3	353.2	353.2	353.3	353.2
3	357.7	360.4	358.4	358.9	357.9	355.7	353.7	353.3	353.1	353.1	353.2	353.2
4	357.6	360.6	357.7	358.7	357.7	355.6	353.7	353.2	353.0	353.2	353.2	353.2
5	*a*	360.4	357.4	358.7	357.7	355.4	353.6	353.2	353.0	353.2	353.2	353.2
6	357.4	360.2	357.2	358.7	357.7	355.2	353.5	353.2	353.0	353.1	353.2	353.2
7	356.9	360.1	356.7	358.7	357.7	354.9	353.4	353.2	353.1	353.1	353.2	353.2
8	356.9	359.9	356.7	358.6	358.0	354.9	353.4	353.1	353.1	353.2	353.2	353.2
9	356.4	359.8	356.7	358.6	358.2	354.8	353.4	353.1	353.1	353.1	353.2	353.2
10	355.9	359.8	356.7	358.6	358.4	354.7	353.4	353.1	353.2	353.1	353.2	353.2
11	356.4	359.6	356.8	358.5	358.4	354.6	353.4	353.1	353.2	353.3	353.2	353.2
12	356.4	359.5	357.1	358.5	358.2	354.6	353.4	353.1	353.2	353.2	353.2	353.1
13	356.4	359.5	357.8	358.5	358.2	354.5	353.3	353.2	353.4	353.2	353.2	353.1
14	356.4	360.8	358.4	358.3	358.2	354.5	353.3	353.2	353.2	353.1	353.2	353.2
15	356.4	360.6	359.2	358.2	358.2	356.4	353.3	353.2	353.2	353.1	353.2	353.2
16	355.9	360.9	359.4	358.1	358.2	356.3	353.2	353.1	353.2	353.2	353.2	353.2
17	356.4	361.5	359.6	357.9	358.2	356.0	353.2	353.2	353.2	353.1	353.2	353.2
18	356.9	361.5	359.6	357.9	357.9	355.6	353.3	353.2	353.2	353.4	353.2	352.9
19	356.9	360.6	359.6	357.9	357.6	355.2	353.4	353.2	353.2	353.2	353.2	352.9
20	355.9	360.4	359.3	357.9	357.6	355.0	353.3	353.2	353.2	353.1	353.2	353.0
21	355.6	359.9	359.3	357.9	357.6	354.9	353.6	353.2	353.2	353.1	353.2	353.0
22	355.6	359.7	359.3	357.9	357.4	354.9	354.2	353.2	353.2	353.2	353.2	353.0
23	355.6	359.4	359.4	357.9	357.2	355.0	354.2	353.2	353.2	353.2	353.2	353.0
24	355.8	359.3	359.4	357.8	357.1	354.7	354.2	353.2	353.2	353.1	353.2	353.0
25	355.8	359.2	359.4	357.7	356.9	354.6	354.2	353.2	353.1	353.4	353.2	353.0
26	355.6	359.0	359.2	357.6	356.6	354.4	354.2	353.1	353.0	353.2	353.2	353.0
27	355.4	358.8	359.2	357.6	356.4	354.2	354.1	353.1	353.2	353.2	353.3	353.1
28	356.6	358.8	359.0	357.6	356.3	354.1	353.9	353.1	353.2	353.2	353.3	353.1
29	357.2	358.7	359.0	357.5	356.2	354.0	353.8	355.1	353.2	353.2	353.2	353.1
30	357.9	.....	359.0	357.4	356.1	353.9	353.6	353.2	353.2	353.2	353.2	353.1
31	359.[illegible]	.....	359.0	.....	356.0	.....	353.5	353.1	.....	353.2	.....	353.1

a No record.

OSWEGO RIVER ABOVE PHOENIX DAM.

Observations of the stage of water in the pond above Phœnix dam have been taken by George Archambeau about noon each day, beginning April 16, 1904. The gage at present used is a vertical scale graduated to feet and tenths by copper staples and reading from zero to nine feet. It is attached to the west side of the bulkhead wall, 105 feet east of the east, or right-hand end of the dam. The gage is a few feet above the line of the crest of the dam and is in the entrance of the hydraulic canal. The zero mark is at elevation 357.29. The crest of the dam is at elevation about 359.13. Datum of this gage, as well as that of the gage below, is determined from a bench-mark on the Phœnix guard-lock, the elevation of which is 365.40. Water is diverted to mills at both ends of the dam. Flash-boards are placed on the dam at times. During extreme high water the dam is submerged by backwater from below.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oswego River above Dam at Phoenix, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	363.59	362.34	362.79	363.49	362.84	361.99	360.89	360.94	360.69	360.34	361.34	360.79
2	363.54	362.59	362.64	363.39	362.94	361.89	360.89	360.79	360.29	360.79	361.09	360.79
3	363.49	362.29	362.49	363.34	363.29	361.84	360.89	360.69	360.09	360.49	360.89	360.79
4	363.49	362.14	362.49	363.29	363.19	361.69	360.89	360.59	360.04	361.09	360.84	360.84
5	*a*	362.09	362.49	363.49	363.04	361.74	361.09	360.54	359.79	360.74	360.79	360.89
6	363.24	361.99	362.44	363.39	363.04	361.79	360.89	360.54	360.74	360.49	360.79	361.29
7	363.09	361.94	362.39	363.14	363.04	361.89	360.89	360.19	360.59	360.29	360.79	360.89
8	362.94	361.89	362.59	363.09	363.09	361.79	360.84	361.29	360.29	360.29	361.09	360.84
9	362.89	361.89	362.44	362.99	363.09	361.64	360.79	361.49	360.29	360.39	360.84	360.84
10	362.79	361.89	362.44	362.99	363.29	361.49	360.74	361.29	360.29	360.34	360.79	360.89
11	362.84	361.84	362.49	363.04	363.29	361.39	360.69	361.29	360.29	360.89	360.79	360.89
12	362.99	361.79	362.64	363.19	363.24	361.34	360.84	361.24	360.39	360.79	360.84	360.79
13	362.79	361.89	362.89	363.09	363.19	361.34	360.74	361.24	361.09	360.54	360.89	361.24
14	362.74	362.14	363.19	363.09	363.19	361.49	360.79	361.19	360.79	360.29	360.89	360.69
15	362.74	362.79	363.69	363.14	363.19	362.04	360.79	361.24	360.29	360.34	361.44	360.84
16	362.64	363.29	363.64	363.19	363.09	361.89	360.74	361.24	360.29	360.39	360.99	360.79
17	362.64	363.89	363.74	363.24	363.29	361.84	360.79	361.14	360.29	360.34	360.89	360.69
18	362.59	363.49	363.69	363.04	363.29	361.79	360.84	361.09	360.29	360.94	360.99	360.14
19	362.94	363.49	363.64	363.09	363.59	361.74	361.24	360.99	360.34	360.79	361.09	359.29
20	362.69	363.49	363.69	363.09	363.09	361.69	361.19	360.99	361.29	360.59	361.19	360.74
21	362.44	363.44	363.69	363.09	362.99	361.64	361.34	360.94	360.54	360.49	361.19	360.89
22	362.39	363.39	363.64	363.04	362.94	361.54	361.49	360.94	360.24	360.44	361.54	360.19
23	362.39	363.29	363.64	362.99	362.59	361.39	361.49	361.44	360.29	360.44	361.19	359.69
24	362.54	363.19	363.59	363.04	362.69	361.34	361.49	361.09	360.19	360.39	360.19	359.39
25	362.59	362.99	363.59	363.09	362.39	361.29	361.49	360.99	359.99	361.24	361.09	360.24
26	362.49	362.79	363.54	363.09	362.29	361.29	361.54	360.89	359.99	361.09	361.04	360.59
27	362.29	362.64	363.54	363.04	362.19	361.29	361.39	360.8	361.09	360.99	361.04	360.79
28	362.19	362.59	363.54	362.94	362.09	361.29	361.34	360.84	360.69	360.94	360.99	360.49
29	362.09	362.54	363.69	362.84	362.09	361.09	361.29	360.89	360.74	360.89	361.44	360.14
30	361.99	......	363.59	362.74	362.09	360.99	361.24	361.29	......	360.84	360.89	359.84
31	362.29	......	363.54	......	362.09	......	361.19	360.94	......	360.89	......	359.59

a No record.

GAGES ON ONEIDA LAKE AND RIVER.

Oneida lake has a water-surface area of 80 square miles and lies at an elevation of 370 feet above tide. The drainage basin within a radius of 10 miles to the south and west is relatively flat, with numerous swampy tracts. The lake receives, through Chittenango and Oneida creeks, drainage from an extensive area of the central New York plateau and, through Wood and Fish creeks on the east, drainage from a portion of the west slope of the plateau bordering the Adirondack mountains. On the north the drainage area is less extensive and the inflowing streams are small.[a]

The outflow from the lake through Oneida river joins Seneca river at Three River Point, forming Oswego river. From Brewerton to Three River Point the distance, in a straight line, is but eight miles; following the windings of the stream it is sixteen miles.

a A portion of the drainage area is shown on the Syracuse, Chittenango, Oneida, Oriskany, Morrisville, Cazenovia and Tully topographic atlas sheets of the United States Geological Survey.

Gages for Determining Elevation of Water-surface on Oneida River

LOCATION.	DISTANCE IN MILES.* Place to place	From Three River Point	Usual time of read ng [illegible]	Present type of gage.
Three River Point	0	0	7 a. m	Board with coppered staples.
Below Oak Orchard dam	5.3	5.3	6 a. m.; 7 p. m	Board with coppered staples.
Above Oak Orchard dam	0	5 3	6 a. m., 7 p. m.	Board with coppered staples.
Below Caughdenoy lock.	7 4	12 7	8 a. m	Board with coppered staples.
Above Caughdenoy lock	0	12 7	8 a. m	Board with coppered staples.
Brewerton	4 0	16 7	8 a. m	Board with coppered staples.
Sylvan Beach	21 6	38.3	8 a. m	Graduated board

* Measured along course of stream on U S. Geological Survey topographic map.

ONEIDA RIVER AT THREE RIVER POINT, N. Y.

A vertical gage is attached to the right-hand side of the upstream end of the pier nearest the left-hand bank of Oneida river on the highway bridge crossing the river at Three River Point. This gage is so located as to show the water-level at the mouths of Oneida and Seneca rivers, and at the head of Oswego river. The gage is graduated decimally from zero to nine feet and has been read each morning by J. Chamberlain, beginning April 16, 1904.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River at Three River Point, N. Y.

DAY.
1906.
1
2
3
4
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ONEIDA RIVER AT SCHROEPPEL'S BRIDGE.

The gaging station was established August 30, 1902, and is maintained by the U. S. Geological Survey in coöperation with this Department. It is located seven miles up-stream from Three River Point.

Observations of stream stage, which are taken each morning and evening by Louis McArthur, are made from a gage above Oak Orchard State dam, 0.4 mile above Schroeppel's bridge. The gage readings have been taken above the dam to avoid backwater from ice or other causes as far as possible. A calibration curve for the cross-section of the stream at Schroeppel's bridge has been obtained by current-meter measurements.

Above a certain stage the dam becomes submerged and the discharge is modified. A special rating table, deduced from measurements made during the period of submergence, is used to calculate the discharge during the high-water period. Allowance is made for the opening of lock-paddles in winter, and for flashboards when used.

Current-meter Discharge Measurements of Oneida River at Schroeppel's Bridge.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Feet.*	*Square feet.*	*Feet per second.*	*Second-feet.*
Feb. 26..	Niles and Clark	5.7	......	1,645	2.90	4,770
Feb. 28..	Niles and Clark	5.5	......	1,555	2.74	4,267
April 6..	Niles and Patchke	6.8	......	2,004	3.23	6,478
May 15..	E. C. Niles	6.3	......	1,822	3.17	5,780
May 29..	E. C. Niles	5.2	......	1,372	2.67	3,665
June 2..	E. C. Niles	5.2	......	1,372	2.48	3,406
June 19..	Weeks and Clark	4.8	......	1,274	2.26	2,885
Sept. 7..	Niles and Overocker	3.55	......	822	1.03	843
Sept. 15..	A. T. Clark	3.48	......	672	1.04	697
Oct. 1..	Clark and Overocker	3.7	......	683	0.928	634

Mean Daily Discharge, Second-feet, of Oneida River at Schroeppel's Bridge, Euclid P. O., N. Y.

DAY.	Dec.
1908.	
1	1,584
2	1,838
3	1,904
4	1,706
5	1,472
6	1,360
7	1,416
8	1,416
9	1,360
10	1,264
11	1,216
12	1,120
13	1,060
14	960
15	920
16	784
17	608
18	672
19	606
20	608
21	578
22	578
23	592
24	646
25	724
26	784
27	852
28	852
29	784
30	750
31	784
Mean	1 029

Monthly Discharge of Oneida River at Schroeppel's Bridge, Euclid P. O., N. Y.
[Drainage area, 1,400 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	6,797	2,830	4,135	2 950	3 390
February	6,294	3,190	4,617	3 300	3 560
March	7,566	3,[redacted]	5,613	4 010	4 610
April	7,566	5,802	6,650	4 750	5 320
May	7,053	3,378	5,307	3 790	4 360
June	3,284	1,970	2,676	1 910	2 140
July	2,118	1,216	1,696	1 210	1,390
August	1,640	920	1,221	0 872	1 000
September	852	646	728	0 520	0 582
October	1,000	784	807	0 640	0 736
November	1,584	960	1,227	0 876	0 981
December	1,904	578	1,029	0 735	0 845

ONEIDA RIVER BELOW OAK ORCHARD DAM.

A gage was erected by this Department, April 23, 1904, on the fender piles at the lock exit below Oak Orchard dam. The gage is graduated decimally from zero to nine feet, by means of coppered staples. Readings are taken each morning and night by Louis McArthur.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River below Oak Orchard Dam.

DAY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	365.97	364.82	364.27	366.87	365.92	364.17	362.52	362.27	361.42	361.07	361.32	361.82
2	366.07	366.02	364.27	366.87	366.07	364.17	362.47	362.27	361.37	361.22	361.32	361.92
3	366.07	366.27	364.32	366.77	366.17	364.02	362.32	362.12	361.27	361.37	361.37	362.12
4	366.07	366.32	364.37	366.77	366.07	363.87	362.27	362.07	361.12	361.32	361.32	362.02
5	366.17	366.12	364.47	366.67	366.22	363.77	362.17	362.02	361.07	361.22	361.27	361.92
6	366.52	365.92	364.47	366.62	366.42	363.72	362.12	361.82	361.62	361.07	361.27	361.72
7	366.27	366.82	364.57	366.57	366.47	363.52	362.02	361.67	361.57	360.97	361.27	361.77
8	365.82	365.57	364.67	366.57	366.47	363.27	362.07	361.67	361.47	360.97	361.42	361.72
9	365.57	365.47	364.67	366.62	366.32	363.12	362.02	362.32	361.47	360.97	361.37	361.62
10	365.57	365.37	364.67	366.67	366.27	363.07	361.97	362.27	361.47	360.92	361.22	361.57
11	365.72	365.42	364.77	366.72	366.22	363.07	361.97	362.12	361.37	361.17	361.12	361.57
12	365.47	365.37	365.02	366.47	366.12	362.92	362.02	362.17	361.37	361.12	361.22	361.57
13	364.97	365.52	365.27	366.52	366.12	362.87	361.92	362.07	361.42	361.07	361.22	361.42
14	365.02	365.67	365.47	366.47	366.02	363.12	361.82	362.12	361.57	360.92	361.17	361.27
15	365.02	365.87	366.47	366.47	365.97	364.32	361.77	362.17	361.47	360.92	361.72	361.12
16	364.82	366.02	366.82	366.47	365.97	364.17	361.77	362.22	361.27	360.92	361.67	361.07
17	364.77	366.47	366.67	366.47	365.82	363.97	361.77	362.17	361.22	360.97	361.62	360.97
18	364.77	366.67	366.67	366.47	365.72	363.72	362.17	362.07	361.17	360.92	361.57	360.92
19	364.57	366.47	366.57	366.57	365.52	363.67	362.47	361.97	361.27	360.87	361.57	360.87
20	364.42	366.12	366.62	366.37	365.47	363.57	362.52	361.97	361.37	360.87	361.67	360.87
21	364.32	366.62	366.67	365.92	365.32	363.47	362.72	362.02	361.32	360.92	361.67	360.87
22	364.27	365.67	366.57	365.87	365.12	363.42	362.87	362.02	361.12	360.92	361.67	360.87
23	364.27	365.52	366.57	366.02	364.97	363.42	363.07	362.07	361.07	361.12	361.57	360.92
24	364.27	365.22	366.62	366.07	364.97	363.22	363.12	361.92	361.07	361.27	361.62	361.07
25	364.27	364.97	366.67	366.12	364.82	363.17	363.07	361.82	361.07	361.32	361.57	361.12
26	364.27	364.67	366.67	365.97	364.72	363.12	363.02	361.82	361.02	361.37	361.62	361.17
27	364.42	364.62	366.67	365.97	364.52	362.92	362.92	361.67	361.07	361.32	361.67	361.17
28	364.52	364.57	366.77	365.82	364.37	362.82	362.77	361.67	361.07	361.27	361.57	361.17
29	364.62	364.47	366.92	365.77	364.37	362.77	362.62	361.67	361.07	361.17	361.72	361.02
30	364.67	......	366.97	365.82	364.37	362.62	362.42	361.67	361.02	361.17	361.77	360.92
31	364.77	......	366.97	......	364.27	362.52	362.37	361.67	......	361.17	......	360.87

ONEIDA RIVER ABOVE OAK ORCHARD DAM.

Readings of the water-surface elevation above Oak Orchard dam were taken by the U. S. Geological Survey from a reference point on the lock wall, beginning August 30, 1902, as described in connection with the gagings at Schroeppel's bridge. April 23, 1904, a gage was placed on the fender piles a short distance above the entrance to the lock above Oak Orchard dam by this Department. Preceding June 5, 1907, the zero of this gage was at elevation 360.64. Beginning June 5, 1907, the datum has been at elevation 360.83. Readings are taken each morning and night by Louis McArthur. The gage is vertical and is graduated decimally by means of coppered staples.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River above Oak Orchard Dam.

DAY.	Aug.	Sept.	Oct.	Nov	Dec.
1908.					
1	65 33	364 48	364 38	364 63	365 28
2	65 28	364 33	364 43	364 68	365 48
3	65 23	364 38	364 53	364 73	365 58
4	65 28	364 33	364 48	364 73	365 38
5	65 28	364 33	364 53	364 78	365 18
6	65 23	364 33	364 53	364 88	365 08
7	65 08	364 38	364 53	364 83	365 13
8	64 93	364 33	364 53	364 98	365 13
9	65 08	364 33	364 53	364 93	365 08
10	65 03	364 33	364 53	364 88	364 98
11	64 93	364 28	364 58	364 83	364 93
12	64 93	364 28	364 53	364 68	364 83
13	64 93	364 23	364 58	364 78	364 78
14	64 93	364 23	364 53	364 83	364 68
15	64 93	364 18	364 53	364 88	364 58
16	64 93	364 18	364 48	364 88	364 38
17	64 93	364 13	364 43	364 78	364 23
18	64 98	364 13	364 48	364 88	364 18
19	64 83	364 23	364 53	364 93	364 03
20	64 88	364 33	364 48	364 93	364 03
21	64 88	364 28	364 53	364 98	363 93
22	64 78	364 23	364 53	365 03	363 93
23	64 73	364 23	364 58	365 13	363 98
24	64 73	364 23	364 63	365 18	364.13
25	64 68	364 28	364 68	365 18	364 28
26	64 63	364 23	364 68	365 23	364 38
27	64 63	364 33	364 58	365 13	364 48
28	64 63	364 33	364 53	365 13	364 48
29	64 63	364 33	364 58	365 28	364 38
30	64 68	364 33	364 68	365 23	364 33
31	64 58		364 68		364 28

ONEIDA RIVER BELOW CAUGHDENOY LOCK.

A vertical gage was erected by this Department on the fender piles at the left-hand side of Oneida river below Caughdenoy lock, April 22, 1904. The gage is divided decimally to feet and tenths by means of coppered staples and reads from zero to nine feet. The zero mark is at elevation 363.93. Readings of this gage and also of the gage above the lock are taken each morning by Adniram Hart.

During the year 1908 it was found that the bench-mark from which the datum of the gages at Caughdenoy was determined was 0.376 foot higher than the assumed elevation. It is accordingly necessary to correct the datum for each of the gages as follows:

Gage No. 32, below locks, Caughdenoy, April 22, 1904, to March 19, 1905, elevation used, 363.83, corrected elevation, 363.454; March 20, 1905, to August 13, 1908, inclusive, elevation used, 363.93, corrected elevation, 363.554. Gage datum raised on August 14, 1908, to 363.93.

[illegible] April 22, 1904 [illegible]

[illegible] the accompanying table.

[illegible]

Day	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.
1904								
1		[illegible] 6	367.5	[illegible] 3	[illegible] 3	[illegible] 3	364.5	365.5
2		[illegible] 5	[illegible]	[illegible] 2	[illegible]	[illegible]		365.6
3		[illegible] 4	[illegible]		[illegible] 3	365.1	364.7	365.4
4		[illegible] 4	366.8	[illegible] 3	[illegible] 2		364.7	365.3
5		[illegible]		[illegible] 2	[illegible] 2	365.1	364.8	365.5
6		[illegible]	366.7	[illegible]	[illegible] 2	365.1	364.7	
7		[illegible] 9	366.6	365.2		365.1	364.7	365.2
8			366.6	365.2	365.1	365.1	364.8	365.2
9		[illegible] 8	366.5	365.2	[illegible] 1	365.2		365.2
10		[illegible] 5	366.7		[illegible] 1	365.1	364.9	365.1
11		[illegible] 3	366.4	365.1	365.0		364.8	365.1
12		[illegible] 6		365.1	365.0	365.0	365.1	365.1
13		[illegible] 0	366.5	364.9	365.0	365.0	365.4	
14		368.9	366.3	364.9		365.0	364.9	364.6
15			366.2	364.9	365.0	365.0	365.0	364.9
16		368.4	366.1	364.9	365.0	365.0	.....	364.8
17		368.5	366.1		364.9	364.9	365.1	364.8
18		368.4	366.0	365.0	364.9	.....	365.1	365.2
19		368.4		364.9	364.9	364.9	365.1	364.8
20		368.2	366.0	364.9	365.1	365.0	365.4	.....
21		368.1	365.8	364.9	.....	365.9	365.0	364.6
22	370.9		365.6	364.9	365.2	365.0	365.3	364.8
23	370.8	367.8	365.7	365.0	365.3	365.0	.....	364.7
24	370.6	367.8	365.7		365.4	365.0	365.4	364.8
25	370.4	367.8	365.6	364.9	365.3	.....	365.6	364.6
26	370.4	367.7	.....	364.9	365.2	364.5	365.5	364.7
27	370.5	367.2	365.4	365.3	365.3	364.5	365.4	.....
28	370.6	367.5	365.5	365.3		364.5	365.6	364.7
29	370.7		365.5	365.3	365.2	364.6	365.5	364.9
30	370.6	367.4	365.4	365.3	365.2	364.6	.....	364.6
31		367.3	.....	.....	365.2	.....	365.5	.....

a No record on dates left blank. *b* This table supersedes that appearing in 1906 report, supplement, page 133, which was referred to incorrect datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River below Caughdenoy Lock. a b

DAY.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.										
1	......	371.3	369.0	366.0	366.9	365.8	365.5	......	366.3	366.5
2	......	371.5	368.9	366.0	......	365.9	365.6	365.5	366.1	367.1
3	......	371.5	368.8	365.8	366.9	365.9	......	365.4	366.8	......
4	......	371.6	368.7	......	367.0	365.0	366.1	365.4	366.3	367.1
5	......	371.8	368.7	365.8	367.0	365.8	366.2	365.4	......	367.3
6	......	371.8	368.4	365.7	366.9	......	366.3	365.4	367.0	367.3
7	......	372.0	368.3	366.0	366.8	365.7	366.5	365.4	366.4	367.4
8	......	372.0	368.3	365.8	366.7	365.7	366.5	......	366.7	367.4
9	......	371.9	367.9	365.8	......	365.9	366.5	365.2	366.6	367.5
10	......	371.8	367.5	365.9	366.5	365.7	......	365.4	366.7	......
11	......	371.6	367.9	......	366.4	365.6	366.4	365.6	366.8	368.1
12	......	371.5	367.9	365.8	366.4	365.8	366.5	365.5	......	367.6
13	......	371.5	367.7	365.9	366.3	......	366.3	365.7	366.5	367.5
14	......	371.5	367.7	365.8	366.3	365.6	366.3	366.2	366.8	367.3
15	......	371.3	367.6	365.9	366.2	365.8	366.4	......	366.8	367.0
16	......	371.1	367.4	365.8	......	365.7	366.2	366.3	366.4	367.0
17	......	370.8	367.3	365.8	366.2	365.8	......	366.3	366.5	......
18	......	370.6	367.3	......	366.2	365.9	366.2	366.4	366.6	367.0
19	......	370.5	367.0	366.5	366.1	365.8	366.2	366.3	......	367.0
20	......	370.3	367.0	366.6	366.0	......	366.2	366.5	366.5	366.9
21	......	370.2	366.9	366.5	366.0	365.7	366.2	366.7	366.5	367.0
22	......	370.1	366.9	366.8	365.9	365.6	366.1	......	366.4	367.2
23	......	370.0	366.7	366.7	......	365.5	366.0	366.5	366.3	367.1
24	366.0	370.0	366.6	366.9	365.7	365.5	......	366.6	366.4	......
25	366.6	369.8	366.5	......	365.5	365.4	365.9	366.5	366.2	367.3
26	367.7	369.7	366.5	367.0	365.5	365.3	365.8	366.4	......	367.3
27	368.9	369.5	366.4	367.0	365.4	......	365.8	366.6	365.9	367.3
28	369.7	369.4	366.3	367.1	365.3	365.2	365.7	366.4	366.4	367.5
29	370.2	369.3	366.2	367.1	365.3	365.2	365.7	......	366.3	367.7
30	370.6	369.1	366.1	367.0	......	365.3	365.6	366.3	366.0	367.2
31	371.0	......	366.1	......	365.8	365.5	......	366.3	......	......

a No record on dates left blank. *b* This table supplements that appearing in 1906 report, supplement, page 133, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River below Caughdenoy Lock. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	367.4	368.1	366.8	......	367.6	366.1	......	365.4	364.9	364.7	364.5	365.2
2	367.5	367.9	366.6	368.1	367.8	366.0	365.9	365.4	......	364.7	364.6	......
3	367.4	368.1	366.8	368.2	367.4	......	365.8	365.4	364.8	364.7	364.5	365.4
4	367.5	......	......	368.1	367.8	365.9	365.9	365.4	364.8	364.7	......	365.3
5	367.5	367.6	367.0	368.3	367.8	365.8	365.9	......	364.8	364.8	364.6	365.3
6	367.7	367.4	367.2	368.4	......	365.7	365.9	365.5	364.7	364.8	364.5	365.7
7	......	367.2	367.2	368.4	367.6	365.7	365.8	365.4	364.7	......	364.5	365.9
8	367.8	367.2	367.1	......	367.4	365.9	......	365.4	364.7	364.8	364.6	366.2
9	367.7	367.1	366.9	368.7	367.6	366.4	365.7	365.4	......	364.0	364.5	......
10	367.7	366.9	366.9	369.2	367.1	......	365.7	365.4	364.7	364.9	364.5	366.3
11	367.6	......	......	369.0	367.2	366.4	365.7	365.3	364.7	364.9	......	366.0
12	367.6	366.9	366.8	368.8	367.5	366.5	365.8	365.3	364.7	364.9	364.6	366.0
13	367.5	366.9	366.8	368.9	......	366.5	365.8	365.3	364.6	364.8	364.7	365.8
14	......	366.6	366.7	369.0	367.3	366.4	365.7	365.2	364.5	......	364.7	365.9
15	367.4	366.5	366.7	......	367.2	366.3	......	365.1	364.6	364.8	364.7	366.0
16	367.4	366.5	366.5	369.1	367.1	366.3	365.6	365.2	......	364.8	364.6	......
17	367.3	366.4	366.4	369.2	367.1	......	365.5	365.2	364.6	365.0	364.7	366.3
18	367.4	......	......	369.2	367.0	366.6	365.4	365.2	364.6	365.0	......	366.3
19	367.4	366.2	366.4	369.1	366.9	366.5	365.4	......	364.5	365.2	364.8	366.3
20	367.3	366.2	366.2	369.1	......	366.3	365.4	365.1	364.5	365.1	364.9	366.4
21	367.5	366.2	366.3	369.0	366.7	366.2	365.3	365.2	364.5	......	364.9	366.4
22	367.6	366.2	366.1	......	366.7	366.2	......	365.1	364.5	365.0	364.9	366.3
23	367.8	366.5	366.1	368.7	366.5	366.0	365.2	365.1	......	364.8	364.9	......
24	367.9	366.5	366.1	368.6	366.3	......	365.2	365.1	364.6	364.5	365.0	366.2
25	368.2	......	......	368.5	366.2	366.0	365.1	365.1	364.8	364.5	......	366.1
26	368.4	366.7	366.0	368.4	366.0	365.9	365.2	......	364.7	364.4	365.2	366.0
27	368.5	366.8	366.3	368.3	......	365.8	365.2	365.1	364.6	364.5	365.0	365.9
28	......	366.6	366.9	368.1	366.3	365.8	365.1	365.0	364.6	......	365.2	365.9
29	368.3	......	367.2	......	366.2	365.7	......	365.0	364.7	364.5	365.3	365.8
30	368.3	......	367.6	367.9	366.2	365.7	365.4	365.0	......	364.5	365.4	......
31	368.1	......	367.8	......	366.1	......	365.4	365.0	......	364.5	......	366.4

a This table supersedes that appearing in 1906 report, supplement, p. 134, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River below Caughdenoy Lock a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	[illegible]	[illegible]	[illegible]v.	Dec.
1907.												
1	366 4	367 0	365 2	369 0	367 6	366 6	365 6	365 4			6 0	. . .
2	366 6	366 8	365 2	369 0	367 8	. .	365 6	365.4			6.0	366 4
3	367 0			369 0	367 8	366 2	365 8	365 4			. .	366.6
4	366 4	367 0	365 2	368 8	368 0	366 2	365 8	.			6 0	366 4
5	366 6	366 6	365 0	368 8	.	366 2	365 6	366 4			6 4	366 4
6		366 6	365 0	368 6	367 8	366 0	365.8	365.4			6 6	366 2
7	369 2	366 6	365 0	.	367 8	366 2		365 4			6 4	366 2
8	369 4	366 4	365 0	368 6	367 6	366 4	365 6	[illegible]			7 2	. . .
9	369 4	366 4	365 0	368 4	367 6	.	365 6	365 4			7 6	366.2
10	369 4		.	368 0	367 4	366 4	[illegible]	[illegible]				366 4
11	369 4	366 2	365 0	368 0	367 4	366 6	365 6				7 6	366 4
12	369 4	366 4	365 0	368 0		366 2	365 6	365 2			7 6	366.6
13		366 2	365 0	368 0	367 4	366 2	365 6	365 2			7.6	366 8
14	369 0	366 0	365 0		367 4	366 0		365 0			7.2	367.2
15	369 6	365 8	365 2	367.8	367 6	366 0	365 6	365 2			7 6	. . .
16	368 8	365 8	365 4	367 8	367 0	. .	365 6	365 2			7 4	365 6
17	368 8			367 4	367 0	365 8	365 4	365.2				365.8
18	369 0	365 6	366 0	367 4	367 0	365 8	365 4				7 2	366.2
19	368 4	365 8	366 2	367 4		365 8	365 4	365 0			7 2	366 2
20	.	365 6	365 8	367 0	366 6	365 8	365 4	365 0			7 0	367.2
21	368 0	365 4	366 4		366 6	365 6		365 0			7 4	366.2
22	368 2	365 8	366 6	367 0	366 6	365 6	365 4	365 0			7 0	.
23	368 0	365 4	366 8	367 0	366 8		365 4	365 0			6.8	366.4
24	368 0			367 0	366 6	365 4	365 4	365 0			.	367 2
25	368 0	365 2	367 6	367 4	366 4	365 8	365 4				6 8	367 8
26	367 6	365 4	368 0	367 4	.	365 0	365 4	364 8			6.8	. .
27	. .	365 2	368 2	367 6	366 8	365 2	365 2	364 8			6 4	366 4
28	367 4	365 2	368 6		366 0			364 8			6 6	366.4
29	367 2	. . .	368 8	367 8	366 4	365 0	365 6	364.8			6 6	. .
30	367 2	. . . . .	368 8	367 8	366 4	.	365 4	364 8			6 6	366 8
31	367 2				366 4	.	365 4	364 8	. . .	. . . .		366 2

a This table supersedes that appearing in 1907 report, p. 425, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River below Caughdenoy Lock

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	368 55	366 75	367 65	369 55	368 75	367 15	365 85	365.75	364 83	364 53	364 83	365 33
2	368 55	367 15	367 75	369 75	369 15	367 15	365 65	365 75	364 63	364 53	364 73	365 03
3	368 65	367 85	367 55	369 55	368 95	367 05	365 65	365 75	364 53	364 53	364 73	65 33
4	368 75	367 45	367 55	369 65	369 35	366 95	365 65	365 65	364 53	364 53	364 53	65 33
5		366 75	367 55	369 75	369 25	366 95	365 45	365 65	364 63	364 53	364 63	.65 23
6	369 55	367 05	367 65	369 55	369 25	366 85	365 45	365 55	364 63	364 53	364 63	365 23
7	368 65	366 75	367 45	369 55	369 65	366 65	365 45	365 55	364 53	364 63	364 83	365 43
8	368 45	366 65	367 45	369 95	369 45	366 55	365 05	365 45	364 53	364 53	364 83	365 03
9	368 05	366 45	367 35	369 35	369 05	366 45	365 15	365 45	364 53	364 43	364 93	365 23
10	367 85	366 35	367 35	369 35	368 95	366 35	365 65	365 45	364 53	364 43	364 73	365 13
11	368 35	366 15	367 45	369 75	369 15	366 25	365 65	365 35	364 53	364 63	364 93	365 23
12	367 75	366 05	367 45	369 45	369 05	366 15	365 55	365 35	364 43	364 53	364 83	365 13
13	367 55	365 95	367 85	369 85	368 85	366 15	365 45	365 25	364 43	364 63	364 83	365 03
14	367 45	365 75	368 15	369 85	368 85	366 05	365 45	365 35	364 43	364 63	364 83	365 13
15	367 55	366 45	368 55	369 75	368 85	366 95	365 35	365 23	364 43	364 53	364 93	365 03
16	367 45	366 95	368 95	369 55	368 75	366 65	365 35	365 33	364 42	364 43	365 03	365 13
17	368 25	367 75	369 05	369 65	368 55	366 65	365 35	365 23	364 33	364 43	364 83	364 73
18	367 25	367 95	369 15	369 55	368 55	366 75	365 45	365 23	364 33	364 43	365 03	364 63
19	367 25	368 35	369 25	369 45	368 55	366 65	365 75	365 23	364 33	364 53	365 03	364 13
20	367 25	368 25	369 15	369 45	368 45	366 45	365 85	365 13	364 43	364 53	365 03	363 93
21	367 05	368 35	369 15	369 15	368 25	366 45	366 05	365 13	364 43	364 63	365 13	363 93
22	366 95	368 25	369 15	369 35	368 15	366 45	366 25	365 13	364 33	364 63	365 13	363 93
23	366 95	368 15	369 15	369 25	367 95	366 45	366 35	365 03	364 33	364 63	365 13	363 93
24	366 95	368 05	369 05	369 15	367 75	a	366 25	365 13	364 32	364 53	365 13	364 33
25	366 85	368 05	369 15	369 25	367 65	366 25	366 25	365 03	364 33	364 73	365 23	364 33
26	366 75	368 05	369 25	369 05	367 55	366 25	366 25	365 03	364 33	364 73	365 23	364.33
27	366 55	367 95	369 25	369 15	367 45	366 15	366 15	365 03	364 43	364 73	365 23	364 43
28	367 05	367 65	369 45	369 05	367 45	366 15	366 15	365 03	364.53	364 73	365 13	364 63
29	366 55	367 65	369 55	368 95	367 25	365 95	366 05	364 93	364 43	364 73	365 23	364 73
30	366 85	. . .	369 65	368 85	367 25	365 65	365 95	364 93	364 63	364 73	365 33	364 53
31	366 65		369 85		367 15	. .	365 75	364 93	. . .	364 83	. .	364 53

a No record.

ONEIDA RIVER ABOVE CAUGHDENOY LOCK.[a]

A vertical gage was erected on the fender piles at the up-stream entrance to Caughdenoy lock, April 22, 1904. The gage is divided decimally to feet and tenths by coppered staples. The elevation of the zero mark is 365.69. A fall of a few feet occurs in the Oneida river at Caughdenoy. This fall is concentrated at a series of eel weirs, forming zigzag barriers which partially obstruct the flow. The lock enables boats to pass the weirs.

a See note on p. 480, regarding error in gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River above Caughdenoy Lock. a b

DAY.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1904.								
1	......	372.9	371.1	369.7	369.3	369.5	369.2	370.1
2	......	372.8	371.0	369.5	369.2	369.3	......	370.2
3	......	372.8	370.8	......	369.1	369.3	369.4	370.1
4	......	372.7	370.7	369.7	369.2	......	369.6	370.0
5	......	372.6	......	369.6	369.2	369.3	369.6	370.1
6	......	372.6	370.5	369.7	369.2	369.3	369.6	......
7	......	372.5	370.5	369.6	......	369.3	369.6	370.0
8	......	......	370.6	369.6	369.1	369.3	369.6	370.0
9	......	372.4	370.5	369.7	369.1	369.4	......	370.0
10	......	372.2	370.5	......	369.2	369.3	369.7	369.9
11	......	372.1	370.4	369.5	369.0	......	369.6	369.9
12	......	372.0	......	369.5	369.0	369.2	369.9	369.9
13	......	371.9	370.5	369.3	369.0	369.2	370.0	......
14	......	371.9	370.4	369.5	......	369.2	369.9	369.6
15	......	......	370.3	369.5	368.9	368.9	369.8	369.7
16	......	371.6	370.1	369.5	369.0	369.1	......	369.7
17	......	371.7	370.2	......	368.9	369.1	369.9	369.7
18	......	371.7	370.2	369.4	368.7	......	369.9	369.8
19	......	371.6	......	369.5	368.8	369.1	369.9	369.7
20	......	371.5	370.2	369.4	369.1	369.2	370.1	......
21	......	371.4	370.1	369.4	......	369.1	369.7	369.6
22	373.1	......	369.9	369.4	369.3	369.1	369.8	369.8
23	373.0	371.3	370.0	369.5	369.4	369.1	......	369.7
24	372.9	371.3	370.0	......	369.6	369.1	370.0	369.8
25	372.8	371.2	370.0	369.4	369.6	......	370.1	369.5
26	372.8	371.2	......	369.4	369.3	369.2	370.1	369.7
27	372.9	370.7	369.7	369.3	369.5	369.2	370.1	......
28	372.8	371.1	369.9	369.3	......	369.3	370.1	369.6
29	372.9	......	369.9	369.3	369.4	369.4	370.1	369.9
30	372.9	371.0	369.8	369.4	369.5	369.4	......	369.6
31	......	370.9	......	......	369.3	......	370.1	......

a No record on dates left blank. b This table supersedes that appearing in 1906 report, supplement, page 134, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River above Caughdenoy Lock. a b

DAY.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.										
1	......	373.1	371.9	370.2	370.7	370.0	369.9	......	370.5	370.6
2	......	373.2	371.8	370.2	......	370.0	369.8	370.1	370.4	370.5
3	......	373.3	371.8	370.1	370.6	370.0	......	369.9	370.8	......
4	......	373.3	371.7	......	370.7	370.1	370.2	369.9	370.5	370.6
5	......	373.4	371.7	370.2	370.7	370.0	370.2	369.9	......	371.0
6	......	373.4	371.6	370.1	370.6	......	370.3	370.0	370.9	371.0
7	......	373.6	371.4	370.4	370.6	369.9	370.4	369.9	370.7	371.1
8	......	373.6	371.5	370.1	370.5	370.0	370.4	......	370.7	371.1
9	......	373.5	371.2	370 1	......	370.1	370.4	369.9	370.6	371.2
10	......	373.5	371.4	370.2	370.4	370.0	......	370.0	370.7	......
11	......	373.4	371.4	......	370.3	370.0	370 4	369.9	370.7	371.0
12	......	373.3	371.3	370.1	370.4	370.0	370.3	369.8	......	370.8
13	......	373.3	371.2	370.1	370.3	......	370.2	370.0	370.6	370.9
14	......	373.2	371.2	370.1	370.3	370.0	370.3	370.4	370.8	370.9
15	......	373.1	371.2	370.2	370.3	370.2	370.4	......	370.7	371.0
16	......	373.0	371.1	370.1	......	369.9	370.3	370.4	370.5	370.9
17	......	372.8	371.0	370.1	370.2	370.0	......	370.4	370.6	......
18	......	372.8	371.0	......	370.2	370.1	370.3	370.5	370.7	370.7
19	......	372.7	370.8	370.3	370.2	370.1	370.3	370.4	......	370.7
20	......	372.6	370.8	370.5	370.1	......	370.3	370.6	370.7	370.6
21	......	372.5	370.7	370.5	370.1	370.0	370.3	370.3	370.6	370.7
22	......	372.5	370.7	370.6	370.0	370.0	370.3	......	370.6	370.7
23	......	372.4	370.7	370.6	......	369.9	370.2	370.7	370.5	370.9
24	369.9	372.4	370.6	370.7	369.9	369.9	......	370.6	370.6	......
25	370.5	372.3	370.5	......	369.8	369.8	370.2	370.6	370.4	371.0
26	371.0	372.2	370.5	370.8	369.8	369.8	370.2	370.6	......	371.0
27	371.5	372.1	370.5	370.7	369.8	......	370.1	370.7	370.4	371.0
28	371.8	372.1	370.4	370.8	369.8	369.7	370.0	370.5	370.5	371.1
29	372.2	372.0	370.4	370.8	369.8	369.7	370.1	......	370.4	371.1
30	372.5	371.9	370.3	370.7	......	369.8	370.0	370.5	370.3	370.8
31	372.8	......	370.3	......	369.9	369.9	......	370.5	......	......

a No record on dates left blank. *b* This table supersedes that appearing in 1906 report, supplement, page 135, which is referred to incorrect datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River above Caughdenoy Lock. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	371.0	371.5	370.7	......	371.2	370.2	......	369.4	368.8	368.5	369.2	370.0
2	371.1	371.4	370.7	371.4	371.3	370.1	370.2	369.5	......	368.5	369.2	......
3	371.0	371.4	370.8	371.5	371.0	......	370.1	369.5	368.7	368.5	369.2	370.0
4	371.2	......	......	371.4	371.3	370.2	370.0	369.5	368.7	368.5	......	370.0
5	371.1	371.2	370.9	371.5	371.2	370.1	370.1	......	368.7	368.6	369.2	370.0
6	371.1	371.2	371.0	371.5	......	370.1	370.1	369.4	368.6	368.6	369.2	370.1
7	......	371.1	371.0	371.6	371.2	370.1	370.1	369.4	368.6	......	369.1	370.1
8	371.1	371.0	370.9	......	371.1	370.3	......	369.4	368.6	368.4	369.1	370.1
9	371.0	371.0	370.9	371.8	371.2	370.5	370.0	369.4	......	368.4	369.3	......
10	371.0	370.9	370.9	371.9	370.9	......	370.0	369.5	368.6	368.5	369.2	370.1
11	370.9	......	......	371.7	371.0	370.5	370.0	369.3	368.6	368.6	......	370.1
12	370 9	370.8	370.8	371.8	371.0	370.5	370.1	......	368.6	368.6	369.3	370.1
13	370.8	370.5	370.8	371.8	......	370.5	370.1	369.3	368.6	368.6	369.3	370.1
14	......	370.3	370.7	371.9	371.0	370.4	370.0	369.2	368.5	......	369.3	370.2
15	370.9	370.6	370.7	......	370.9	370.4	......	369.2	368.5	368.6	369.5	370.2
16	370.9	370.6	370.6	371.9	370.9	370.5	369.9	369.1	......	368.5	369.2	......
17	370 8	370.5	370.6	372.0	370.9	......	369.9	369.2	368.4	368.5	369.5	370.3
18	370.7	......	......	372.0	370.8	370.5	369.8	369.1	268.4	368.6	......	370.4
19	370.7	370.5	370.6	371.9	370.7	370.5	369.8	......	368.4	368.6	369.5	370.4
20	370.7	370.5	370.4	371.9	......	370.4	369.8	369.0	368.4	368.7	369.5	370.4
21	......	370.5	370.5	372.0	370.7	370.3	369.7	369.1	368.4	......	369.6	370.4
22	370.9	370.5	370.4	......	370.6	370.4	......	369.2	368.4	368.9	369.6	370.4
23	371.0	370.6	370.4	371.8	370.5	370.2	369.7	369.1	......	368.9	369.6	......
24	371.3	370.6	370.4	371.6	370.4	......	369.6	369.1	368.5	368.9	369.6	370.3
25	371.6	......	......	371.6	370.4	370.2	369.6	369.1	368.4	368.9	......	370.4
26	371.7	370.7	370.4	371.5	370.4	370.2	369.6	......	368.3	368.9	369.8	370.4
27	371.7	370.8	370.3	371.5	......	370.1	369.6	369.0	368.4	369.0	369.9	370.4
28	......	370.7	370.6	371.4	370.4	370.1	369.6	368.9	368.4	......	369.9	370.3
29	371.7	......	370.9	......	370.4	370.1	......	368.9	368.5	368.9	369.9	370.3
30	371.6	......	371.1	371.3	370.4	369.9	369.4	368.9	......	369.1	370.0	......
31	371.5	......	371.2	......	370.3	......	369.4	368.8	......	369.1	......	370.4

a This table supersedes that appearing in 1906 report, supplement, p. 135, which is referred to incorrect datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River above Caughdenoy Lock. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	370.4	370.7	369.8	371.9	371.1	370.6	370.0	369.8	.....	368.9	370.4	.....
2	370.7	370.7	369.8	371.8	371.2	.....	370.0	369.8	368.9	369.0	370.4	370.7
3	370.9	.....	.....	371.8	371.2	370.3	370.1	369.6	368.9	369.1	.....	370.8
4	371.1	370.6	369.7	371.8	371.3	370.4	370.0	.....	368.9	369.0	370.5	371.0
5	371.6	370.5	369.7	371.6	.....	370.4	370.1	369.8	368.9	369.1	370.6	370.7
6	.....	370.4	369.7	371.6	371.2	370.2	370.1	369.7	368.8	.....	370.8	370.6
7	372.0	370.4	369.7	.....	371.2	370.4	.....	369.7	368.9	369.3	370.6	370.6
8	372.1	370.4	369.7	371.7	371.2	370.5	370.1	369.6	.....	369.1	371.0	.....
9	371.9	370.4	369.7	371.4	371.2	.....	369.9	369.6	369.0	369.6	371.2	370.6
10	372.1	.....	.....	371.2	371.0	370.4	370.0	369.6	368.9	369.8	.....	370.6
11	371.9	370.2	369.6	371.3	371.0	370.5	370.0	.....	369.0	369.9	371.2	370.7
12	372.1	370.1	369.8	371.3	.....	370.5	369.9	369.5	369.0	369.9	371.3	370.8
13	.....	370.2	369.8	371.2	371.1	370.4	369.9	369.4	369.1	.....	371.3	370.9
14	371.8	370.1	369.9	.....	371.0	370.3	.....	369.3	369.1	370.0	371.1	371.3
15	371.6	370.1	369.9	371.1	371.2	370.3	370.0	369.4	.....	369.9	371.3	.....
16	371.6	370.1	370.0	371.1	370.8	.....	369.9	369.4	369.1	370.0	371.2	370.2
17	371.6	.....	.....	370.9	370.9	370.2	369.9	369.3	369.1	370.0	.....	370.4
18	371.5	370.1	370.2	370.9	370.9	370.1	369.9	.....	369.3	369.6	371.1	370.4
19	371.4	370.1	370.4	371.0	.....	370.1	369.9	369.3	369.3	369.9	371.1	370.4
20	.....	370.0	370.3	370.8	370.7	370.1	369.9	369.2	369.0	.....	371.0	370.6
21	371.4	369.9	370.4	.....	370.6	370.1	.....	369.2	369.0	369.8	371.1	370.4
22	371.4	369.9	370.6	370.8	370.6	370.1	369.9	369.2	.....	370.0	370.9	.....
23	371.3	369.8	370.7	370.8	370.6	.....	369.9	369.2	369.2	369.9	370.9	370.7
24	371.2	.....	.....	370.8	370.5	370.1	369.8	369.2	368.9	369.9	.....	370.9
25	371.1	369.7	370.7	371.0	370.6	370.0	369.9	.....	368.5	369.9	.....	371.2
26	371.0	369.8	371.2	371.0	.....	370.0	369.8	368.9	368.9	369.8	370.8	.....
27	.....	369.8	371.3	371.1	370.7	369.4	369.6	368.9	369.0	.....	370.9	371.6
28	370.9	369.8	371.5	.....	370.2	.....	.....	369.0	369.0	370.0	370.6	371.7
29	370.8	.....	371.6	371.3	370.5	370.0	369.9	369.0	.....	370.1	370.8	.....
30	370.8	.....	371.7	371.2	370.5	.....	369.7	369.0	368.9	370.2	370.8	371.9
31	370.8	.....	.....	.....	370.5	.....	369.8	368.9	.....	370.4	.....	371.5

a This table supersedes that appearing in 1907 report, p. 426, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River above Caughdenoy Lock.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	372.01	370.71	371.31	372.51	371.71	370.91	370.31	369.91	369.01	*a*	368.41	368.91
2	371.91	370.61	371.31	372.41	372.11	371.01	370.21	369.81	369.01	*a*	368.51	368.71
3	371.91	370.61	371.21	372.41	371.91	371.01	370.21	369.91	368.91	*a*	368.41	369.21
4	371.91	370.41	371.31	372.31	372.21	370.91	370.21	369.81	368.91	368.51	367.91	369.21
5	*a*	370.51	371.31	372.41	372.21	370.91	370.01	369.81	368.91	368.51	368.31	369.01
6	371.61	370.51	371.31	372.31	372.21	370.91	370.01	369.71	369.01	368.61	368.11	369.21
7	371.61	370.51	371.11	372.31	372.51	370.81	370.01	369.81	368.91	368.61	368.41	369.11
8	371.51	370.41	371.21	372.71	372.21	370.71	369.51	369.71	368.81	368.41	368.51	369.01
9	371.61	370.41	371.11	372.21	371.91	370.61	369.91	369.71	368.81	368.31	368.61	369.21
10	371.51	370.41	371.11	372.51	371.91	370.61	369.91	369.61	368.81	368.41	368.61	369.21
11	371.51	370.31	371.11	372.31	372.11	370.51	369.81	369.61	368.81	368.31	368.61	369.31
12	371.51	370.41	371.11	372.31	372.01	370.51	369.71	369.61	368.81	368.41	368.31	369.31
13	371.31	370.31	371.21	372.51	371.91	370.51	369.71	369.51	368.71	368.51	368.61	369.31
14	371.31	370.41	371.41	372.51	372.01	370.51	369.61	369.51	368.71	368.41	368.51	369.31
15	371.31	370.51	371.61	372.41	372.01	370.31	369.61	369.51	368.81	368.41	368.41	369.31
16	371.21	370.81	371.81	372.41	371.91	370.61	369.61	369.61	368.71	368.41	368.81	369.41
17	371.21	371.11	372.01	372.41	371.61	370.71	369.61	369.41	368.61	368.41	368.41	369.51
18	371.21	371.31	372.01	372.41	371.81	370.81	369.61	369.41	368.61	368.41	368.91	369.61
19	371.21	371.51	372.01	372.31	371.81	370.71	369.81	369.41	368.61	368.31	369.01	369.41
20	371.11	371.51	372.01	372.31	371.71	370.61	369.91	369.31	368.81	368.41	368.81	369.51
21	371.01	371.61	372.01	372.11	371.61	370.61	370.01	369.31	368.61	368.41	369.01	369.71
22	370.81	371.51	372.01	372.21	371.51	370.61	370.01	369.31	368.51	368.51	369.01	369.71
23	371.01	371.51	372.01	372.21	371.41	370.61	370.11	369.21	368.61	368.51	369.01	369.71
24	370.81	371.51	371.91	372.11	371.31	*a*	370.11	369.21	368.51	368.41	369.01	369.81
25	370.91	371.51	372.01	372.21	371.31	370.51	370.21	369.21	368.51	368.61	369.01	369.81
26	370.91	371.51	372.11	372.01	371.21	370.51	370.21	369.21	368.61	368.61	369.11	369.81
27	370.71	371.41	372.11	372.11	371.11	370.41	370.11	369.11	368.61	368.51	369.01	370.01
28	370.81	371.31	372.21	372.01	371.21	370.41	370.11	369.11	*a*	368.61	369.01	370.01
29	370.71	371.31	372.31	372.01	371.01	370.31	370.11	369.11	*a*	368.51	369.11	369.91
30	370.71	.....	372.41	371.91	371.11	370.21	370.01	369.01	*a*	368.51	369.31	370.01
31	370.71	.....	372.51	.....	371.01	.....	370.01	369.01	.....	368.31	.....	369.81

a No record.

ONEIDA RIVER AT BREWERTON BRIDGE.

A gage is attached to the left-hand face of a square timber crib filled with stone, adjacent to the fender piles immediately upstream from the center pier of the swinging span of the highway bridge at Brewerton. This bridge is located close to the foot of Oneida lake and the gage shows very nearly the stage of the lake. The gage was erected April 22, 1904, and was read during 1907, each morning by W. M. Hubbard.

The bench-mark from which the datum of the gage at Brewerton was formerly determined having been found to be 0.376 foot in error, it has been necessary to correct the records previously published as follows:

April 22, 1904, to April 30, 1904, inclusive, datum used, 366.59, correction, —.376, corrected datum, 366.214; May 1, 1904, to December 31, 1907, 367.06, corrected datum, 366.684. This also applies throughout the year 1908.

The corrected elevations are republished in the accompanying tables.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River at Brewerton Bridge (Foot of Oneida Lake.) a b

DAY.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904.									
1	......	373.7	371.5	370.0	369.5	369.6	369.4	370.3	369.6
2	......	373.6	371.4	369.9	369.5	369.5	......	370.4	369.7
3	......	373.5	371.2	369.9	369.5	369.5	369.6	370.3	369.8
4	......	373.4	371.1	369.9	369.5	......	369.7	370.2	......
5	......	373.3	......	369.9	369.5	369.5	369.7	370.2	369.6
6	......	373.3	370.9	370.0	369.5	369.5	369.7	......	369.7
7	......	373.2	370.9	369.9	......	369.5	369.7	370.2	369.6
8	......	......	370.9	369.8	369.4	369.5	369.7	370.2	369.7
9	......	373.1	370.9	369.9	369.4	369.5	......	370.2	369.7
10	......	372.8	371.0	......	369.5	369.4	369.8	370.1	369.6
11	......	372.7	370.7	369.8	369.2	......	369.7	370.1	......
12	......	372.6	......	369.7	369.2	369.3	370.1	370.0	369.7
13	......	372.6	370.7	369.6	369.2	369.3	370.0	......	369.5
14	......	372.5	370.7	369.7	......	369.3	370.1	369.9	369.5
15	......	372.4	370.6	369.7	369.1	369.2	370.0	369.9	369.5
16	......	372.4	370.6	369.7	369.1	369.3	......	369.9	369.4
17	......	372.4	370.6	......	369.0	369.2	370.0	370.0	369.5
18	......	372.4	370.4	369.7	368.9	......	370.0	370.0	......
19	......	372.2	......	369.7	369.0	369.2	370.0	370.0	369.5
20	......	372.0	370.5	369.7	369.1	369.3	370.1	......	369.5
21	......	371.9	370.2	369.7	......	369.2	370.0	369.9	369.5
22	373.8	......	370.2	369.6	369.5	369.3	370.1	369.9	369.4
23	373.8	371.7	370.3	369.7	369.5	369.3	......	369.8	369.4
24	373.6	371.7	370.2	......	369.7	369.3	370.2	369.7	369.5
25	373.4	371.6	370.2	369.6	369.7	......	370.3	369.7	......
26	373.6	371.5	......	369.5	369.4	369.3	370.3	369.8	369.5
27	373.6	371.4	370.2	369.6	369.7	369.4	370.2	......	369.5
28	373.6	371.4	370.2	369.6	......	349.4	370.3	369.8	369.6
29	373.7	......	370.1	369.6	369.5	369.5	370.3	369.7	369.7
30	373.7	371.4	370.0	369.6	369.6	369.4	......	369.8	369.9
31	......	371.4	......	......	369.5	......	370.3	......	369.9

a No records on dates left blank. *b* This table supersedes that appearing in 1906 report, supplement, page 136, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-Surface (Barge Canal Datum) of Oneida River at Brewerton Bridge (Foot of Oneida Lake) a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.												
1	.....	370.4	369.9	374.2	372.3	370.5	371.1	370.2	370.0	.....	370.6	371.2
2	370.6	370.4	369.9	....	372.3	370.5	....	370.2	370.1	370.3	370.6	370.6
3	370.5	370.4	369.9	374.3	372.3	370.4	371.1	370.2	.....	370.2	370.9	.....
4	370.5	370.3	369.9	374.3	372.3	...	371.0	370.3	370.2	370.1	370.7	371.3
5	370.5	.....	.....	374.4	372.3	370.3	371.0	370.2	370.5	370.1	.....	371.4
6	370.7	370.4	369.7	374.6	372.1	370.3	371.0	.....	370.6	370.2	370.2	371.3
7	370.5	370.2	370.0	374.7	371.7	370.6	370.9	370.2	370.7	370.1	370.9	371.4
8	.....	370.2	369.8	374.7	371.9	370.3	370.8	370.2	370.7	.....	370.7	371.5
9	370.7	370.2	369.8	.....	371.9	370.3	.....	370.2	370.7	370.0	370.7	371.7
10	370.7	370.2	369.7	374.4	371.7	370.4	370.8	370.2	.....	370.2	371.0	.....
11	370.6	370.1	369.8	374.4	371.7	.....	370.7	370.2	370.7	370.1	371.0	371.5
12	370.7	...	...	374.3	371.6	370.3	370.7	370.2	370.7	370.1	.....	371.5
13	370.7	370.2	369.8	374.3	.....	370.3	370.7	...	370.7	370.1	371.0	371.5
14	370.7	370.2	369.8	374.2	.....	370.3	370.6	370.2	370.7	370.5	371.1	371.4
15	....	370.1	369.7	374.0	371.5	370.3	370.6	370.4	370.8	.....	371.1	371.5
16	370.6	370.1	369.7	...	371.5	370.3	.....	370.2	370.6	370.6	371.0	371.4
17	370.6	370.1	369.7	373.7	371.4	370.3	370.6	370.3	.....	370.7	371.0	.....
18	370.5	370.0	369.7	373.6	371.3	...	370.5	370.3	370.6	370.7	371.0	371.2
19	370.5	.....	....	373.5	371.2	370.7	370.5	370.3	370.7	370.7	.....	371.1
20	370.5	370.0	369.8	373.5	371.1	370.7	370.4	.....	370.6	370.8	370.9	371.0
21	370.6	370.0	369.9	373.2	.....	370.8	370.4	370.2	370.6	371.9	370.9	371.1
22	....	370.0	370.1	373.2	371.0	370.9	370.4	370.2	370.6	.....	370.9	371.0
23	370.5	369.9	370.3	...	371.0	371.0	.....	370.1	370.5	370.9	370.8	371.2
24	370.7	369.9	370.5	373.2	371.0	371.0	370.2	370.1	.....	370.8	370.8	.....
25	370.4	369.9	369.9	373.1	370.9	.....	370.0	370.1	370.4	370.8	370.7	371.4
26	370.5	.....	....	373.0	370.7	371.0	370.0	370.0	370.4	370.9	....	371.4
27	370.5	369.9	371.7	372.9	370.7	371.0	370.0	.....	370.4	370.9	370.6	371.4
28	370.4	369.9	372.3	372.8	...	371.1	370.0	370.0	370.3	370.5	370.7	371.5
29	.	....	372.6	372.6	370.6	371.0	370.1	369.9	370.2	.....	370.6	371.5
30	370.5	.....	373.2	.....	370.6	371.1	....	370.0	370.2	370.7	370.7	371.4
31	370.5	....	373.7	.....	370.6	.....	370.2	370.0	.....	370.7	.....	.....

a This table supersedes that appearing in 1906 report, supplement, p. 136, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River at Brewerton Bridge (Foot of Oneida Lake) a

DAY.	Ja
1906.	
1	37
2	37
3	37
4	37
5	37
6	37
7	.
8	37
9	37
10	37
11	37
12	37
13	37
14	.
15	37
16	37
17	371
18	371
19	371
20	371
21	..
22	371
23	371
24	371
25	372
26	372
27	371
28	.
29	372
30	372
31	371

a This table supersedes that appearing in 1906 report, supplement, p. 137, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River at Brewerton Bridge (Foot of Oneida Lake) a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	370.78	371.08	369.98	372.48	371.48	370.48	369.88	369.98	368.88	369.08	370.58	370.78
2	370.78	370.98	369.88	372.48	371.48	370.58	369.98	369.98	368.88	369.08	370.58	370.68
3	370.88	370.98	369.98	372.48	371.48	370.58	369.98	369.98	368.98	369.18	370.58	370.68
4	371.08	370.88	369.98	372.38	371.58	370.58	369.98	369.98	368.98	369.18	370.58	370.68
5	371.18	370.88	369.98	372.38	371.58	370.58	370.08	369.88	368.98	369.18	370.48	370.68
6	372.28	370.78	369.98	372.28	371.58	370.78	370.08	369.88	368.98	369.28	371.08	370.68
7	372.38	370.78	369.98	372.28	371.48	370.68	369.98	369.78	369.08	369.28	371.38	370.68
8	372.58	370.68	369.98	372.28	371.48	370.58	369.98	369.78	369.08	369.28	371.58	370.68
9	372.58	370.58	369.98	372.18	371.48	370.58	369.98	369.78	369.08	369.38	371.58	370.68
10	372.68	370.58	369.98	372.08	371.48	370.48	369.98	369.78	369.08	369.48	371.58	370.68
11	372.48	370.58	369.98	371.98	371.38	370.38	370.08	369.68	369.08	369.58	371.58	370.68
12	372.48	370.48	369.98	371.78	371.38	370.38	370.08	369.68	369.08	369.68	371.58	370.68
13	372.38	370.48	369.98	371.68	371.38	370.38	369.98	369.68	369.08	369.88	371.68	370.68
14	372.38	370.48	369.98	371.58	371.28	370.38	369.98	369.58	369.08	369.98	371.58	370.68
15	372.28	370.48	370.08	371.48	371.28	370.38	369.98	369.58	369.08	369.98	371.48	370.68
16	372.18	370.38	370.18	371.48	371.28	370.28	369.98	369.58	369.08	369.98	371.48	370.68
17	371.98	370.28	370.38	371.38	371.18	370.18	369.98	369.48	369.08	369.98	371.38	370.88
18	371.98	370.28	370.38	371.38	371.08	370.18	369.98	369.48	369.08	370.08	371.38	370.98
19	371.88	370.18	370.48	371.38	371.08	370.08	369.98	369.48	369.08	370.08	371.28	371.08
20	371.78	370.08	370.58	371.18	371.08	370.08	369.98	369.48	369.08	370.08	371.28	371.08
21	371.88	370.08	370.58	371.08	370.98	370.08	369.98	369.38	369.08	370.08	371.18	371.08
22	371.68	369.98	370.78	371.08	370.88	370.18	369.98	369.38	369.08	370.08	371.08	371.08
23	371.58	369.98	370.88	370.98	370.78	370.08	369.98	369.28	369.08	370.18	371.08	371.28
24	371.48	369.98	371.28	371.08	370.68	370.08	369.98	369.18	369.08	370.18	370.98	371.68
25	371.38	369.98	371.38	371.18	370.58	370.08	369.88	369.18	369.08	370.28	370.98	371.88
26	371.38	369.98	371.68	371.38	370.48	369.98	369.88	369.08	369.08	370.28	370.98	371.98
27	371.38	369.98	371.78	371.58	370.48	369.98	369.98	368.98	369.08	370.28	370.98	371.98
28	371.38	369.98	371.98	371.58	370.68	369.88	369.98	368.98	369.08	370.38	370.98	372.08
29	371.28	.....	372.18	371.48	370.78	369.88	369.98	368.88	369.08	370.48	370.98	372.18
30	371.18	.....	372.48	371.48	370.68	369.98	369.98	368.88	369.08	370.48	370.98	372.08
31	371.08	.....	372.48	.....	370.68	.....	369.98	368.88	.....	370.48	.....	372.08

a This table supersedes that appearing in 1907 report, p. 427, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida River at Brewerton Bridge (Foot of Oneida Lake).

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	372.08	370.88	371.58	373.18	372.28	371.28	370.48	370.18	368.58	368.28	368.28	368.88
2	372.08	370.78	371.58	373.08	372.58	371.18	370.48	370.08	368.48	368.28	368.28	368.98
3	372.08	370.78	371.58	372.98	372.68	371.18	370.48	370.08	368.58	368.28	367.98	368.98
4	372.08	370.78	371.58	372.98	372.78	371.18	370.48	370.08	368.58	368.28	368.08	369.08
5	372.18	370.78	371.58	372.98	372.78	371.18	370.38	369.98	368.58	368.28	368.18	368.98
6	372.08	370.78	371.48	372.98	372.68	371.18	370.28	370.08	368.58	368.28	368.18	368.98
7	371.88	370.68	371.48	372.88	373.18	371.08	370.28	369.98	368.58	368.28	368.28	368.98
8	371.88	370.58	371.48	372.88	372.68	371.08	370.28	369.98	368.58	368.28	368.28	368.88
9	371.88	370.58	371.48	372.88	372.48	370.98	370.28	369.98	368.58	368.28	368.28	368.88
10	371.88	370.58	371.48	372.88	372.58	370.98	370.28	369.98	368.58	368.28	368.38	368.98
11	371.88	370.58	371.48	372.68	372.58	370.88	370.18	369.98	368.58	368.38	368.28	369.08
12	371.68	370.48	371.58	372.78	372.58	370.78	370.18	369.98	368.58	368.28	368.28	369.08
13	371.58	370.48	371.68	372.88	372.48	370.68	370.08	369.88	368.58	368.28	368.38	369.08
14	371.58	370.48	371.78	372.98	372.38	370.58	370.08	369.78	368.58	368.28	368.38	369.18
15	371.58	370.58	372.08	372.98	372.38	370.58	369.98	369.68	368.58	368.28	368.48	369.28
16	371.58	371.18	372.28	372.88	372.38	370.88	369.88	369.68	368.48	368.28	368.48	369.28
17	371.48	371.28	372.38	372.88	372.28	370.98	369.78	369.68	368.38	368.28	368.58	369.28
18	371.38	371.68	372.38	372.88	372.28	370.98	369.68	369.58	368.38	368.28	368.48	369.38
19	371.38	371.88	372.48	372.88	371.68	371.08	369.78	369.48	368.38	368.28	368.58	369.38
20	371.38	371.88	372.58	372.88	371.68	370.98	369.88	369.48	368.38	368.28	368.58	369.38
21	371.28	371.88	372.58	372.58	371.68	370.88	370.08	369.48	368.38	368.28	368.68	369.48
22	371.18	371.88	372.48	372.58	371.68	370.88	370.08	369.48	368.38	368.28	368.68	369.48
23	371.08	371.88	372.48	372.88	371.68	370.88	370.38	369.28	368.38	368.28	368.68	369.48
24	371.08	371.88	372.48	372.78	371.68	370.88	370.48	369.28	368.38	368.28	368.68	369.48
25	371.08	371.78	372.48	372.78	371.68	370.78	370.58	369.18	368.28	368.28	368.78	369.48
26	371.08	371.78	372.48	372.68	371.58	370.78	370.48	369.18	368.28	368.38	368.78	369.48
27	371.08	371.78	372.58	372.68	371.58	370.68	370.38	369.08	368.28	368.48	368.78	369.48
28	371.08	371.68	372.68	372.68	371.48	370.58	370.28	368.98	368.28	368.48	368.88	369.48
29	371.08	371.68	372.98	372.48	371.48	370.48	370.28	368.78	368.38	368.38	368.88	369.58
30	370.98	.....	373.08	372.48	371.48	370.48	370.28	368.78	368.48	368.28	368.88	369.58
31	370.88	.....	373.18	.....	371.48	.....	370.18	368.68	.....	368.28	.....	369.58

ONEIDA LAKE AT MOUTH OF FISH CREEK AT SYLVAN BEACH, N. Y.

Fish creek enters Oneida lake at the eastern end of the lake. A gage was erected July 1, 1904, on the highway bridge crossing Fish creek at Sylvan Beach. This bridge is within a short distance of the outlet of Fish creek and the gage shows practically the water-level in the eastern end of the lake. The gage is vertical and is attached to piles at the left-hand end of the bridge on the down-stream side. The gage reads from 370.00 to 379.00 feet, and is divided to tenths of feet by notches. The readings are elevations above Barge canal datum. Readings are taken at 8 A. M. by F. B. Randall.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Oneida Lake at Mouth of Fish Creek at Sylvan Beach, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	372.7	371.1	371.9	373.4	373.0	371.6	370.7	370.7	369.4	368.8	368.8	369.5
2	372.8	371.1	371.9	373.5	372.9	371.6	370.7	370.6	369.4	368.9	368.8	369.5
3	372.6	371.1	371.9	373.4	373.2	371.5	370.6	370.5	369.4	368.8	368.9	369.45
4	372.5	371.0	371.9	373.4	373.0	371.5	370.6	370.5	369.4	368.8	368.9	369.45
5	372.5	370.9	371.8	373.2	373.0	371.4	370.5	370.4	369.3	368.7	368.9	369.4
6	372.5	370.9	371.8	373.2	372.9	371.3	370.5	370.4	369.3	368.7	369.0	369.5
7	372.2	370.9	371.8	373.2	372.5	371.2	370.5	370.4	369.3	368.7	368.8	369.5
8	372.2	370.9	371.8	373.0	372.7	371.1	370.6	370.4	369.3	368.7	368.7	369.5
9	372.1	370.8	371.8	373.5	373.0	371.1	370.4	370.3	369.2	368.7	368.7	369.4
10	372.0	370.8	371.7	373.4	372.9	371.1	370.4	370.3	369.2	368.6	368.7	369.4
11	371.9	370.7	371.6	373.6	372.8	371.1	370.4	370.3	369.2	368.8	368.8	369.4
12	371.9	370.7	371.6	373.7	372.8	371.1	370.3	370.2	369.2	368.7	369.1	369.4
13	371.9	370.7	371.7	373.4	372.6	370.9	370.3	370.2	369.2	368.7	369.1	369.5
14	371.9	370.7	371.9	373.3	372.6	370.8	370.3	370.2	369.2	368.6	369.0	369.5
15	371.8	370.8	372.1	373.2	372.5	371.0	370.2	370.2	369.1	368.7	369.1	369.4
16	371.8	371.4	372.5	373.3	372.4	371.2	370.2	370.1	369.0	368.7	369.0	369.4
17	371.7	371.8	372.7	373.2	372.4	371.2	370.1	370.1	369.0	368.7	369.4	369.4
18	371.7	372.1	372.8	373.1	372.4	371.2	370.2	370.1	368.9	368.7	369.0	369.4
19	371.6	372.2	372.8	373.1	372.3	371.2	370.7	370.0	368.9	368.7	369.0	369.4
20	371.5	372.2	372.8	373.1	372.1	371.2	370.7	369.9	368.8	368.6	369.1	369.6
21	371.5	372.3	372.8	373.2	372.1	371.2	370.7	369.9	368.8	368.6	369.0	369.7
22	371.4	372.2	372.7	373.0	371.9	371.2	370.9	369.9	368.8	368.6	369.1	369.7
23	371.4	372.2	372.7	373.0	371.9	371.1	370.9	369.8	368.8	368.5	369.1	369.8
24	371.4	372.2	372.7	372.9	371.8	371.1	370.9	369.8	368.8	368.5	369.1	369.9
25	371.4	372.1	372.8	372.7	371.8	371.1	370.9	369.7	368.8	368.5	369.2	369.9
26	371.3	372.0	372.8	372.8	371.7	371.0	370.9	369.6	368.8	368.5	369.2	369.1
27	371.3	372.0	372.9	372.7	371.7	371.0	370.9	369.6	368.8	368.6	369.4	369.1
28	371.2	372.0	373.0	372.7	371.7	370.9	370.8	369.6	368.7	368.6	369.5	369.1
29	371.2	372.0	373.2	372.7	371.6	370.8	370.8	369.5	368.8	368.8	369.4	369.1
30	371.1	......	373.4	372.7	371.6	370.8	370.7	369.5	368.8	368.8	369.4	369.1
31	371.1	......	373.4	......	371.6	......	370.7	369.5	......	368.9	......	369.1

WOOD CREEK AND CANADA CREEK NEAR ROME, N. Y.

Canada creek joins Wood creek about five miles west of Rome, and Wood creek thence flows westerly, entering Oneida lake at Sylvan Beach. Current-meter measurements were made to determine the flow in Wood creek and Canada creek during the low-

water season of 1908, as shown in the accompanying table. The measurements were made at highway bridges located on each stream about one-quarter mile above the junction. An additional measurement was made at the second highway bridge below the junction on October 23, this bridge being about nine miles west of Rome. The flow of these streams above the points of measurement is subject to little or no artificial control.

Current-meter Discharge Measurements of Canada Creek and Wood Creek, West of Rome, N. Y.

DATE.	Hydrographer.	Canada Creek, 5 Miles West of Rome.		Wood Creek, 5 Miles West of Rome.		Wood Creek, 9 Miles West of Rome.	
		Stage. *a*	Discharge.	Stage. *b*	Discharge.	Stage. *c*	Discharge.
1908.		*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
Oct. 19...	A. T. Clark........	10.0	9.87	9.45	9.85	......	....
Oct. 23...	A. T. Clark........	10.02	9.61	9.42	9.47	7.00	18.10

a Reference point, top of abutment, right-hand, down-stream side of bridge.
b Reference point, top of abutment, left-hand, down-stream side of bridge, beside gage.
c Reference point, top of right-hand, projecting floor-beam, down-stream side of bridge.

ONEIDA CREEK.

DESCRIPTION.

The head waters of Oneida creek are in northeastern Madison county. Above Peterboro the drainage is mostly through a swamp averaging one-half mile in width by 2½ miles in length. The stream flows easterly from this swamp to the foot of the falls above Munnsville. In the vicinity of the falls the stream descends from elevation 1,100 to elevation 700 in about three miles. From Munnsville to Oneida the creek flows through a somewhat dissected valley of one mile average width, bordered by steep slopes rising 500 feet or more within a distance of one mile on either side. North of Oneida Castle the drainage is rather flat. Oneida creek enters the eastern end of Oneida lake near South Bay, the elevation of the lake being at 370. Water-power is utilized at Oneida Community and at Munnsville. A feeder dam at Oneida Castle diverts most of the low-water flow to the Erie canal through a feeder 2.9 miles long entering the canal at Durhamville. The drainage basin as a whole is irregularly pear-shaped and the upper

basin is broad. The slopes are steep and the tributaries are well distributed and moderately branching. This basin is shown on the Morrisville, Oneida, Chittenango and Cazenovia sheets of the U. S. Geological Survey topographic map.

ONEIDA CREEK AT KENWOOD, N. Y.

A gaging station was established at the Oneida Community Dam and Silk Mill, June 11, 1907, by Robert E. Horton. A four-foot enameled steel gage graduated to hundredths of feet is attached to a tree on the left-hand bank of Oneida creek, 175 feet up-stream from the dam. The dam is of timber, having a crest length of 79.25 feet. The crest is nearly level and the cross-section is uniform throughout the entire length. A board gage with painted 10th-foot marks was also placed in the tail-race immediately below the silk mill. The silk mill contains one 24-inch Hercules and one 24-inch Camden water-wheel. Records are kept by Carl Hatch, showing the crest and tail-race gage readings each morning and night, together with the gate opening and number of hours run per day for each water-wheel. The elevations are referred to an assumed bench-mark consisting of a chiselled cross on the up-stream corner of the right-hand abutment of the dam.

Elevation of assumed bench mark	100.00
Elevation of crest of gage zero	94.01
Mean crest elevation about	95.60
Tail-race gage zero	82.97

Current-meter measurements were made in the tail-race to determine the turbine discharge in 1907.

The results of gagings at this station, 1898 to 1900, inclusive, may be found in the report of State Engineer and Surveyor for 1902, supplement, pages 49–52. Additional data is given in the report for 1906, supplement, pages 138–139.

Mean Daily Discharge, Second-feet, of Oneida Creek at Kenwood, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	154	124	a106	138	277	49.9	33.9	12.3	19.5	32.8	a3.9	19.8
2	114	a103	346	170	141	42.1	33.9	a3.0	19.5	7.0	21.7	20.1
3	106	113	244	125	a138	38.9	33.6	19.8	19.5	17.4	19.5	19.5
4	110	112	273	116	112	37.8	4.1	19.5	19.8	a3.0	23.1	19.5
5	a96.1	101	171	a114	91.4	36.2	a16.0	19.5	15.2	25.4	19.2	19.5
6	67.6	b	97.4	186	86.5	25.4	5.9	19.5	a3.0	24.1	19.2	a3.0
7	64.7	b	217	138	153	a24.0	9.6	19.5	3.0	19.4	17.5	20.9
8	64.7	b	a106	138	238	40.7	16.0	14.9	20.3	17.4	a9.6	28.5
9	77.3	ab	134	221	174	35.5	13.3	a3.0	12.4	13.9	25.5	24.2
10	64.7	b	107	168	a226	38.1	9.6	20.3	12.3	17.7	23.7	20.0
11	68.3	b	277	142	170	37.4	9.6	19.8	12.9	a5.0	27.4	22.0
12	a57.4	b	274	a122	134	35.7	a9.6	19.8	15.7	22.4	28.0	18.7
13	138	b	336	126	112	22.8	19.5	19.5	a3.0	20.1	20.4	a16.0
14	112	b	383	112	118	a16.0	19.8	19.5	21.1	19.8	24.6	23.9
15	87.1	171.4	a584	134	112	38.5	19.8	14.9	20.1	19.8	a16.0	23.5
16	106	a716	382	126	94.2	38.9	19.5	a3.0	19.8	21.7	24.5	22.4
17	91.4	336	277	98.9	a96.1	34.4	21.9	19.8	19.8	17.5	24.8	22.1
18	89.0	238	214	104	91.4	34.7	16.8	19.5	19.8	a3.0	20.0	20.3
19	a80.6	234	170	a171	81.8	34.3	a19.0	20.1	17.5	20.3	20.4	20.8
20	98.3	153	138	146	75.0	22.5	21.9	19.5	a3.0	24.5	29.0	a55.0
21	76.2	131	112	118	68.1	a4.0	19.8	19.5	19.8	19.5	20.8	40.4
22	197	112	a106	112	67.4	34.2	22.9	15.0	19.8	23.7	a16.0	16.3
23	148	a106	168	81.8	51.9	34.2	20.0	a3.0	19.8	12.8	24.4	7.0
24	101	108	258	75.0	a55.0	34.2	19.8	19.5	12.4	17.5	23.0	8.3
25	109	57	214	73.7	49.4	34.2	17.5	19.5	12.3	a3.0	20.3	75.2
26	a138	342	202	a55.0	46.9	34.1	a16.0	19.5	17.5	25.4	13.3	55.0
27	148	338	318	64.7	54.9	21.7	21.9	19.5	a3.0	38.5	24.1	a55.0
28	106	107	306	118	46.6	a9.6	26.3	19.5	21.3	33.1	20.1	22.7
29	101	92.9	a329	81.2	85.9	28.6	19.5	14.9	24.7	29.7	a3.0	12.9
30	101	......	202	86.5	29.4	26.5	19.5	a3.0	30.9	24.5	20.7	9.8
31	101	......	154	......	a33.2	......	19.5	12.4	......	17.7	......	21.6
Mean	102	267	232	122	106	31.5	18.6	15.9	16.0	19.3	20.1	24.6

a Indicates Sundays. *b* Record not available.

Monthly Discharge of Oneida Creek at Kenwood, N. Y.
[Drainage area, 63 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	197	64.7	102	1.62	1.86
February	1,714	57.0	267	4.24	4.58
March	584	97.4	232	3.68	4.23
April	186	55.0	122	1.93	2.16
May	277	29.4	106	1.68	1.93
June	49.9	4.0	31.5	0.500	0.560
July	33.9	4.1	18.6	0.295	0.339
August	20.3	3.0	15.9	0.252	0.290
September	30.9	3.0	16.0	0.254	0.284
October	38.5	3.0	19.3	0.306	0.352
November	29.0	3.0	20.1	0.319	0.357
December	75.2	3.0	24.6	0.390	0.448

CHITTENANGO CREEK.

DESCRIPTION.

Chittenango creek is the principal tributary of Oneida lake from the south. It comprises three main branches: Butternut creek, Limestone creek and Chittenango creek proper. The three branches join near North Manlius. Above the junction of Butternut creek, Chittenango creek flows through an irregular dumbbell-shaped area extending in a northwest and southeast direction. This area lies chiefly in the dissected, hilly region south of the line of the New York Central railroad. The length of the basin is about 22 miles. Its width in the upper portion is 9 miles; in the middle portion, 4 miles; in the lower portion, 7 miles. The drainage basin is deeply rolling, mostly cleared and has a heavy, impervious soil with extensive sodded-meadow areas. The soil is underlaid by shale rock, often outcropping, and affording numerous springs. The stream tributaries are somewhat sparce. Marsh and swamp areas are very limited, with the exception of the Nelson swamp, about two square miles in area.

There were formerly several water-powers in use in the deep narrow valley between Chittenango falls and Chittenango. The outflow from Cazenovia lake is regulated and there is also a reservoir at Erieville. These reservoirs are used to supply the summit level of the Erie canal. The capacities of these reservoirs are given as follows in New York State Barge Canal Report for 1901, page 663:

Erieville Reservoir.

Tributary drainage area.................	5.4 square miles
Storage capacity	318,424 cubic feet
Water-surface	340 acres

Cazenovia Lake.

Tributary drainage area.................	8.7 square miles
Storage capacity	206,997 cubic feet
Water-surface	1.7 square miles

The head of the stream is near Erieville reservoir, which is formed by a dam crossing a small stream valley, formerly tributary to Chenango river through Eaton brook. Results of gag-

ings of Chittenango creek at Bridgeport, where the stream debouches into Oneida lake, may be found in the report of the State Engineer and Surveyor for 1902, supplement, pages 57–61. Cazenovia lake is located 10 miles below the Erieville reservoir, which is at the head of the stream at elevation 1,190. From its outlet to the foot of the plateau at Erie canal crossing the stream descends 770 feet, the distance, following the general trend of the valley, being 11 miles. At Chittenango falls there occurs a precipitous descent of about 100 feet.

CHITTENANGO CREEK AT CHITTENANGO, N. Y.

A current-meter gaging station was established at Main street highway bridge in Chittenango village, May 22, 1901, by R. E. Horton, for the U. S. Geological Survey, by which it was maintained until July 9, 1905, when it was transferred to the care of this Department. Current-meter measurements have been taken and rating table made, from which the accompanying tables have been computed.

The stream at this point is entrained between parallel walls, affording a channel 50 feet wide, over which the bridge passes at a single span. The bridge stands at an angle to the thread of the stream, and has a span between abutments of 57 feet. The gage board is secured in a vertical position to the right abutment on the up-stream side, and reads decimally from 0 to 8 feet. The stage of the stream is observed twice daily by the gage-reader, Bessie M. Kellogg. The bench-mark is on the up-stream corner of the coping of the right-hand bridge abutment.

Elevation, bench-mark	458.39
Elevation, gage zero	450.16

The gaging station is one-half mile above the State dam, diverting water for the supply of the summit level of Erie canal. The freshet of December 15, 1901, changed the cross-section of the stream at the gaging station. Separate rating curves have been prepared for the periods preceding and following that date.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Chittenango Creek at Chittenango, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	452.36	451.61	451.86	452.71	452.74	451.96	451.56	451.41	451.44	451.66	451.51	451.56
2	452.31	451.61	452.11	452.56	452.66	451.88	451.51	451.36	451.41	451.56	451.51	451.51
3	452.41	451.66	452.16	452.41	452.54	451.96	451.54	451.36	451.41	451.61	451.51	451.46
4	452.26	*a*	452.16	452.21	452.61	451.98	451.51	451.36	451.41	451.46	451.56	451.51
5	452.21	*a*	452.16	452.06	452.41	451.96	451.54	451.38	451.38	451.51	451.56	451.51
6	452.16	*a*	451.96	452.11	452.26	451.96	451.46	451.36	451.38	451.46	451.51	451.56
7	452.26	*a*	452.16	452.31	452.41	451.94	451.51	451.36	451.38	451.41	451.61	451.51
8	452.36	*a*	452.16	452.51	452.54	451.86	451.46	451.38	451.38	451.41	451.51	451.51
9	452.41	*a*	452.16	452.61	452.39	451.84	451.46	451.48	451.38	451.46	451.61	451.46
10	452.31	*a*	452.06	452.41	452.56	452.01	451.46	451.48	451.38	451.51	451.51	451.46
11	452.16	*a*	452.06	452.26	452.51	451.98	451.46	451.46	451.36	451.51	451.56	451.56
12	452.36	452.06	453.11	452.26	452.51	451.81	451.46	451.44	451.41	451.51	451.51	451.51
13	452.51	452.16	453.16	452.44	452.41	451.81	451.46	451.44	451.36	451.41	451.61	451.71
14	452.41	452.16	453.51	452.21	452.56	451.81	451.51	451.46	451.41	451.51	451.56	451.66
15	452.16	454.26	453.31	452.41	452.51	451.88	451.56	451.41	451.51	451.51	451.61	451.81
16	452.06	454.51	453.11	452.66	452.11	451.81	451.48	451.51	451.46	451.51	451.56	451.86
17	451.96	453.86	452.91	452.54	452.41	451.68	451.51	451.51	451.36	451.56	451.46	451.76
18	451.96	453.31	452.71	452.56	452.11	451.66	451.58	451.51	451.41	451.46	451.56	451.91
19	452.01	453.16	452.51	452.76	452.01	451.74	451.56	451.48	451.46	451.41	451.56	451.96
20	452.11	453.06	452.31	452.61	451.96	451.81	451.56	451.46	451.46	451.51	451.61	451.71
21	452.31	452.66	452.26	452.61	451.96	451.76	451.66	451.38	451.56	451.41	451.61	451.66
22	452.41	452.06	452.16	452.59	451.96	451.76	451.81	451.41	451.46	451.46	451.56	451.66
23	452.26	451.96	452.26	452.51	451.96	451.66	451.64	451.36	451.56	451.41	451.61	451.56
24	452.01	451.96	452.36	452.39	451.86	451.56	451.56	451.46	451.56	451.46	451.61	451.61
25	452.11	451.86	452.46	452.31	451.86	451.56	451.56	451.46	451.66	451.51	451.56	451.66
26	452.21	451.71	452.61	452.16	452.16	451.48	451.41	451.44	451.61	451.51	451.46	451.66
27	452.21	451.66	452.86	451.99	451.96	451.46	451.54	451.56	451.46	451.51	451.56	451.46
28	452.11	451.66	453.01	452.16	451.66	451.54	451.48	451.41	451.46	451.56	451.66	451.41
29	451.81	451.56	453.16	452.14	451.81	451.46	451.46	451.36	451.66	451.51	451.56	451.36
30	451.66	......	453.06	452.06	451.89	451.44	451.46	451.46	451.61	451.51	451.46	451.46
31	451.66	......	452.91	......	451.96	......	451.46	451.36	......	451.51	......	451.36

a No record.

Rating Table for Chittenango Creek at Chittenango, N. Y., for 1908.

Gage height.	Discharge.	Difference.	Gage height.	Discharge.	Difference.	Gage height.	Discharge.	Difference.	Gage height.	Discharge.	Difference.
1.00	30	5	1.90	135	20	2.80	440	45	3.70	910	60
1.00	35	5	2.00	155	25	2.90	485	45	3.80	970	65
1.20	40	10	2.10	180	30	3.00	530	50	3.90	1,035	65
1.30	50	10	2.20	210	30	3.10	580	50	4.00	1,100	70
1.40	60	10	2.30	240	35	3.20	630	50	4.10	1,170	70
1.50	70	15	2.40	275	40	3.30	680	55	4.20	1,240	70
1.60	85	15	2.50	315	40	3.40	735	55			
1.70	100	15	2.60	355	40	3.50	790	60			
1.80	115	20	2.70	395	45	3.60	850	60			

Current-meter Discharge Measurements of Chittenango Creek at Chittenango, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
May 29	A. T. Clark	1.55	84.5	0.883	74.6
Sept. 10	A. R. Patchke	1.32	73.7	0.738	54.4
Sept. 17	A. T. Clark	1.30	71.1	0.699	49.7
Oct. 3	A. R. Patchke	1.28	69.4	0.643	44.6

Mean Daily Discharge, Second-feet, of Chittenango Creek at Chittenango, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	210	65	100	335	340	115	60	45	48	70	55	60
2	195	65	145	275	315	104	55	40	45	60	55	55
3	225	70	155	225	267	115	58	40	45	65	55	50
4	180	.....	155	168	295	120	55	40	45	50	60	55
5	167	.....	155	135	225	115	58	42	42	55	60	55
6	155	.....	115	145	180	115	50	40	42	50	55	60
7	180	.....	155	195	225	111	55	40	42	45	65	55
8	210	.....	155	258	267	100	50	42	42	45	55	55
9	225	.....	155	295	216	96	50	52	42	50	65	50
10	195	.....	135	225	275	125	50	52	42	55	55	60
11	155	.....	135	180	258	120	50	50	40	55	60	60
12	210	135	508	180	258	92	50	48	45	55	55	55
13	257	155	530	230	225	92	50	48	40	45	65	78
14	225	155	708	168	275	92	55	50	45	55	60	70
15	155	1,170	605	225	258	104	60	45	55	55	65	92
16	135	1,340	508	315	145	92	52	55	50	55	60	100
17	115	910	418	265	225	74	55	55	40	60	50	85
18	115	605	335	275	145	70	62	55	45	50	60	108
19	125	530	258	355	125	81	60	52	50	45	60	115
20	145	485	195	295	115	92	60	50	50	55	65	78
21	195	315	180	295	115	85	70	42	60	45	65	70
22	225	135	155	285	115	85	92	45	50	50	60	70
23	180	115	180	258	115	70	68	40	60	45	65	60
24	125	115	210	216	100	60	60	50	60	50	65	65
25	145	100	240	195	100	60	60	50	70	55	60	70
26	167	78	295	155	155	52	45	48	65	55	50	70
27	167	70	395	120	115	50	58	60	50	55	60	50
28	145	70	462	155	70	58	52	45	50	60	70	45
29	92	60	530	150	92	50	50	40	70	55	60	40
30	70	.....	485	135	104	48	50	50	65	55	50	50
31	70	.....	417	.....	115	.....	50	40	.....	55	.....	40
Mean	163	321	296	224	188	88.1	56.5	46.8	49.8	53.4	59.2	65.3

Monthly Discharge of Chittenango Creek at Chittenango, N. Y.

[Drainage area, 79 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	225	70	163	2.06	2.37
February	1,340	60	321	4.06	4.38
March	708	100	296	3.75	4.31
April	355	120	224	2.84	3.18
May	340	70	188	2.38	2.74
June	125	48	88.1	1.12	1.25
July	92	45	56.5	0.715	0.822
August	60	40	46.8	0.592	0.681
September	70	40	49.8	0.630	0.706
October	70	45	53.4	0.676	0.777
November	70	50	59.2	0.749	0.839
December	115	40	65.3	0.827	0.951

LIMESTONE CREEK.

DESCRIPTION.

The natural source of Limestone creek is on the slope of Tinselor hills near Erieville, Madison county, N. Y. In the construction of the Chenango canal, Tioughnioga creek was diverted and De Ruyter reservoir receives the drainage tributary to

this stream above the point of diversion and also that from additional area tributary to Limestone creek, making a total area above the reservoir outlet of 18.8 square miles. The reservoir has a capacity of 504,468,000 cubic feet, and a surface area of about 1.0 square mile. The stored waters are discharged through Limestone creek during the canal navigation season. Water is diverted to a feeder by a dam below Manlius. The feeder is used as a water-power canal to supply several mills at Fayetteville, at which place there is a second diverting dam. The feeder enters Erie canal 1.2 miles below Fayetteville. Power is also developed on Limestone creek at Manlius and Edwards Falls. The head waters of Limestone creek are at elevation 1,900 feet. De Ruyter reservoir is at elevation 1,286 feet. The fall of the stream is rapid in the first three miles below the reservoir, the elevation at the lower end of this reach at Delphi being 900 feet. From Delphi to Buellville the creek follows a winding course over a flat valley bottom averaging about one-half mile in width. The descent in 8 miles between these points is 150 feet. Between Buellville and Manlius, a distance of two miles, a fall of 200 feet occurs. This is mostly concentrated at Edwards Falls. The west or Watervale branch of Limestone creek joins the main stream below Manlius. The precipitous descent of about 100 feet in a short distance occurs at this branch at stone quarry falls. The drainage basin is shown on the Syracuse, Tully, Chittenango and Cazenovia sheets of the U. S. Geological Survey topographic map.

LIMESTONE CREEK AT FAYETTEVILLE, N. Y.

This gaging station, which is located above the State dam at the head of the Erie canal feeder in Fayetteville, was established August 27, 1905, by C. A. Poole.

The gage is a vertical board, graduated in feet and tenths, and is secured to retaining wall on south side of gates at entrance to feeder, about 55 feet above crest of dam. The elevation of zero of gage is 429.53. The elevation of bench-mark on east end of north retaining wall of feeder, 42 feet east of gates, is 434.74. Observations are taken twice daily by C. B. Dunlop.

The dam is of masonry and in good condition, having been rebuilt in 1897. It is of trapezoidal shape with an approach slope of 1 on 6 and vertical down-stream face. The length of crest is

99.1 feet at an average elevation of 431.18. The discharge over the dam has been calculated by means of the weir formula, using coefficients derived from the Cornell University experiments made in 1898.

The flow in the feeder is controlled by gateways at entrance. There are four openings in the bulkhead, which are regulated by means of drop planks.

A gage was temporarily maintained in the canal feeder at Fayetteville, but the fluctuation was so slight that it has been discontinued.

Water is also diverted through the cement mill on east side of creek. Current-meter measurements were formerly made in the raceway to mill, and in the canal feeder. The freshet discharge of the stream can be determined at this site, but a separate gaging station was established at Manlius in July, 1907, to determine the low-water flow.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Limestone Creek above dam at Fayetteville, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	132.88	131.93	431.73	431.83	432.53	431.48	430.03	430.43	129.63	430.88	431.58	431.73
2	132.83	131.93	132.28	431.78	432.33	431.43	130.33	430.08	129.78	430.88	431.43	431.68
3	132.73	131.93	132.08	431.78	432.18	431.33	130.63	429.83	129.83	430.18	430.93	431.53
4	132.73	131.93	431.93	431.68	432.18	431.28	130.63	429.63	129.78	429.63	430.93	431.43
5	132.73	131.93	431.83	431.58	431.98	431.28	430.93	429.78	429.88	429.73	431.03	431.58
6	132.73	131.93	131.83	431.93	431.68	431.23	431.28	430.03	129.88	429.78	431.33	*a*
7	132.78	131.93	431.98	431.78	431.28	131.18	431.23	430.23	430.13	129.88	431.48	*a*
8	132.83	131.93	431.93	131.78	431.48	131.13	431.38	430.33	430.18	430.23	431.03	*a*
9	132.83	131.93	431.83	132.23	431.63	131.03	131.33	430.43	430.23	130.73	431.38	*a*
10	132.83	131.98	431.73	431.88	431.93	131.13	431.23	130.48	430.23	130.73	431.48	*a*
11	132.73	132.03	131.78	431.83	431.88	131.03	131.28	130.43	430.43	130.78	431.73	*a*
12	132.83	132.08	132.23	131.78	431.78	131.08	431.23	130.38	130.63	130.78	431.53	*a*
13	132.78	132.33	132.48	131.68	431.78	131.08	131.28	429.88	430.63	130.88	431.23	*a*
14	132.83	132.93	432.58	131.63	431.93	131.03	431.23	129.88	130.68	131.13	431.03	*a*
15	132.88	134.13	432.63	131.78	431.78	131.03	431.18	429.98	430.48	131.33	430.78	431.63
16	132.88	132.68	432.63	431.83	431.83	430.93	431.13	430.03	430.48	431.48	431.08	431.73
17	132.83	131.88	431.83	131.63	431.73	130.93	131.03	129.88	430.63	431.43	431.38	431.53
18	132.83	131.83	131.78	131.63	431.73	131.03	431.28	429.53	130.68	431.38	431.43	431.58
19	132.78	131.83	431.78	432.18	131.43	130.78	131.38	429.88	430.78	131.38	431.13	431.78
20	132.73	131.83	131.63	131.[illegible]	[illegible]31.48	130.58	431.28	429.73	430.73	431.38	431.08	431.63
21	132.78	131.83	431.73	431.88	431.53	129.73	431.28	129.83	130.73	131.33	431.28	131.68
22	132.78	131.83	431.83	131.73	431.48	429.53	131.33	429.88	430.83	131.43	431.28	431.68
23	132.58	131.83	131.83	131.73	431.43	129.78	131.28	429.73	430.63	131.23	431.28	131.63
24	132.68	131.73	132.03	131.68	131.53	129.83	131.18	429.78	430.48	431.38	431.28	131.58
25	132.53	131.73	431.98	131.73	431.48	129.78	131.13	129.78	430.53	431.38	431.43	431.68
26	132.28	[illegible]1.73	431.88	431.73	431.38	129.88	130.93	429.83	430.58	431.28	431.53	131.58
27	132.2[illegible]	131.83	431.98	131.68	431.53	129.93	430.98	129.83	130.68	431.73	431.43	431.68
28	132.0[illegible]	132.03	132.03	131.83	431.38	129.93	130.93	129.73	130.68	431.88	431.53	431.58
29	131.98	431.93	432.18	131.78	431.23	129.88	130.78	429.83	430.78	431.88	431.43	431.78
30	131.93	......	431.88	431.83	431.28	429.93	430.73	129.63	430.88	431.73	431.53	431.88
31	431.93	......	431.83	......	431.53	......	130.78	429.63	......	431.58	......	431.68

a No record.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Limestone Creek Feeder at Fayetteville, N. Y.

April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
b	b	429.22	429.32	429.22	428.87	429.07	429.07	a
b	b	429.17	429.37	429.12	428.92	429.12	428.97	a
b	b	429.07	429.32	429.12	428.87	429.02	429.02	a
b	b	429.17	429.27	429.02	428.92	429.02	429.02	a
b	b	429.27	429.27	429.07	428.82	429.07	429.07	a
b	b	429.32	429.32	428.97	428.82	429.07	429.07	a
b	b	429.32	429.27	429.02	428.87	429.02	429.12	a
b	b	429.27	429.32	428.97	428.87	429.07	429.07	a
b	b	429.17	429.27	429.02	428.97	429.12	429.17	a
b	429.32	429.17	429.27	429.02	428.92	429.02	429.07	a
b	429.42	429.17	429.22	429.02	428.97	429.07	429.17	a
b	429.32	429.22	429.17	428.92	428.97	429.02	429.07	a
b	429.32	429.27	429.22	428.87	428.97	429.07	429.02	a
b	429.37	429.27	429.27	428.92	429.07	429.17	429.07	a
b	429.47	429.37	429.17	428.92	428.97	429.07	429.07	a
b	429.37	429.37	429.17	428.92	429.02	429.12	429.02	a
b	429.32	429.32	429.17	428.87	429.07	429.07	429.07	a
b	429.37	429.27	429.32	428.82	429.07	429.12	429.07	a
b	429.22	429.27	429.32	428.87	429.02	429.02	429.02	a
b	429.27	429.17	429.27	428.82	429.02	429.07	429.07	a
b	429.37	429.12	429.32	428.92	429.07	429.07	429.02	a
b	429.27	429.07	429.37	428.92	429.02	429.12	429.07	a
b	429.27	429.17	429.27	428.92	428.97	429.07	429.02	a
b	429.27	429.17	429.22	428.92	429.02	429.17	429.07	a
b	429.32	429.22	429.27	428.87	428.97	429.02	429.02	a
b	429.22	429.27	429.27	428.87	429.07	429.07	429.07	a
b	429.37	429.37	429.27	428.92	428.92	429.17	429.02	a
b	429.22	429.27	429.17	428.87	428.97	429.22	429.02	a
b	429.17	429.27	429.27	428.92	429.07	429.17	429.02	a
b	429.27	429.27	429.27	428.87	429.07	429.12	428.97	a
......	429.37	......	429.27	428.87	....	429.07	.....	a

a Navigation closed, water drawn out of feeder.
b No observer.

LIMESTONE CREEK AT MANLIUS, N. Y.

A gaging station was established July 23, 1907, by Robert E. Horton, for this Department, at Wilcox avenue bridge in Manlius. The gage consists of a triangular box containing a scale graduated to tenths from zero to 7.4, and a chain and weight by which the readings are taken. The gage is attached to the bottom chord on the down-stream side of the bridge. The length of the chain and weight is 14.00 feet. Readings are taken by John Carroll at 7 A. M. and 6 P. M. each day. Current-meter measurements are made from the down-stream side of the bridge, starting at the face of the left-hand abutment as an initial point. The bridge is subdivided into 2.5-foot sections for purposes of measurement. The span is 73 feet.

Current-meter Discharge Measurements of Limestone Creek at Manlius, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908		*Feet.*	*Square feet.*	*Ft. per second.*	*Second feet.*
April 23.	E. C. Niles	3.20	50.5	3.72	187.3
May 14.	E. C. Niles	3.35	51.1	3.50	179.3
June 3.	E. C. Niles	2.70	37.6	1.75	66.0
July 18.	A. R. Patchke	2.50	33.4	1.75	58.6
Sept. 9.	A. R. Patchke	2.03	17.2	0.558	9.59
Sept. 17.	A. T. Clark	1.96	19.7	0.40	7.88
Oct. 2.	A. R. Patchke	1.91	16.8	0.358	6.02

Mean Daily Gage Height, in Feet, of Limestone Creek at Manlius, N. Y.

DAY.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.						
1	......	2.75	2.50	2.70	2.90	3.10
2	......	2.82	2.55	2.80	2.90	3.10
3	......	2.72	2.60	2.70	2.90	2.90
4	......	2.70	2.65	3.00	3.00	2.90
5	......	2.60	2.60	3.00	3.10	2.80
6	......	2.65	2.60	3.00	3.10	2.90
7	......	2.65	2.60	3.20	3.20	2.90
8	......	2.65	2.60	3.50	3.40	2.90
9	......	2.65	2.60	3.50	3.40	2.90
10	......	2.65	2.50	3.25	3.40	3.80
11	......	2.60	2.60	3.10	3.35	3.80
12	......	2.65	3.00	3.30	3.05	3.65
13	......	2.30	2.65	3.25	2.85	3.40
14	......	2.45	2.80	3.15	2.80	3.15
15	......	2.50	2.70	3.05	2.90	3.10
16	......	2.45	2.80	3.00	2.90	3.30
17	......	2.30	2.75	2.95	2.90	3.20
18	......	2.40	2.70	2.80	2.90	3.20
19	......	2.30	2.70	2.80	2.90	2.90
20	......	2.50	2.70	2.80	2.90	2.90
21	......	2.25	2.80	2.85	2.90	2.90
22	......	2.40	2.80	2.80	2.90	2.90
23	2.85	2.40	2.75	2.80	2.90	3.35
24	2.77	2.40	2.70	2.80	2.80	3.75
25	4.67	2.50	2.70	2.65	2.80	3.60
26	3.55	2.40	2.65	2.60	2.90	3.55
27	2.85	2.35	2.65	2.80	2.90	3.55
28	2.80	2.45	2.65	2.80	2.90	3.60
29	2.65	2.55	2.65	2.80	3.00	3.60
30	2.60	2.55	2.80	2.80	3.10	3.60
31	2.65	2.55	......	2.80	......	3.60

Mean Daily Gage Height, in Feet, of Limestone Creek at Manlius, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	3.10	*a*	3.05	*a*	3.10	3.35	2.65	2.30	2.32	2.45	2.45	2.68
2	3.00	*a*	3.25	*a*	3.10	2.50	2.35	2.50	2.45	2.65	2.35	2.50
3	2.90	*a*	3.35	*a*	3.45	2.90	2.30	1.90	2.22	2.60	2.35	2.62
4	2.90	*a*	3.45	*a*	3.40	2.70	2.05	1.55	2.22	2.50	2.58	2.50
5	2.70	*a*	3.20	*a*	3.50	2.35	2.25	2.15	2.50	2.30	2.55	2.30
6	2.50	*a*	3.10	*a*	3.35	2.65	2.10	2.30	2.35	2.25	2.45	2.20
7	2.20	*a*	3.45	*a*	3.60	2.60	2.50	2.55	2.35	2.45	2.70	2.30
8	2.20	*a*	3.50	1.10	3.10	2.60	1.65	2.60	2.58	2.50	2.60	2.48
9	2.20	*a*	3.20	3.50	3.45	2.55	1.60	2.45	2.48	2.10	2.58	2.45
10	2.20	*a*	3.25	3.62	4.10	2.46	2.45	2.60	2.40	2.28	2.50	2.22
11	2.20	*a*	3.30	3.60	3.56	2.30	2.30	2.15	2.55	2.62	2.75	2.15
12	2.25	*a*	4.05	2.95	3.10	2.46	2.45	2.25	2.35	1.60	2.70	2.25
13	2.30	*a*	4.30	3.45	3.75	2.60	2.60	2.55	2.40	1.25	2.55	2.40
14	2.30	*a*	4.30	3.20	3.60	2.65	2.65	2.45	2.60	1.50	2.48	2.72
15	2.30	*a*	4.35	3.50	3.80	2.25	2.35	2.15	2.50	1.60	2.53	2.65
16	2.30	4.30	4.45	2.55	3.55	2.30	2.25	1.66	2.45	1.70	2.40	2.62
17	2.30	3.55	3.50	2.55	3.60	2.90	2.65	2.30	2.40	1.70	2.40	2.45
18	2.30	3.50	3.45	2.55	3.40	2.45	2.60	2.15	2.20	2.18	2.60	2.52
19	2.20	3.40	3.30	3.45	3.30	2.60	2.60	2.20	1.66	2.08	2.58	2.55
20	2.20	3.25	3.40	3.10	3.20	2.40	2.30	2.40	2.15	2.15	2.70	2.42
21	2.20	3.15	3.25	3.10	3.30	2.20	2.50	2.35	2.20	2.20	2.62	1.75
22	2.30	3.00	3.40	3.20	3.40	2.60	2.55	2.50	2.30	2.30	2.50	2.05
23	2.25	3.10	3.55	3.10	3.30	2.55	2.50	2.65	2.32	2.35	2.60	2.35
24	2.10	2.95	3.50	3.00	2.75	2.45	2.65	2.50	1.60	2.25	2.72	2.52
25	2.10	2.80	3.55	2.55	2.55	2.30	2.35	2.55	2.10	2.30	2.60	2.40
26	2.10	3.25	3.50	3.50	2.85	2.25	2.45	2.45	2.30	2.40	2.52	2.30
27	2.10	3.50	3.80	3.20	2.10	2.55	2.20	2.42	2.45	2.60	2.60	1.73
28	2.10	3.25	3.75	2.70	2.90	2.45	1.75	2.40	2.42	2.45	2.65	2.15
29	1.90	3.15	3.70	2.70	2.55	2.65	2.50	2.32	2.60	2.60	2.75	2.30
30	1.65	......	3.55	3.65	2.10	2.40	2.45	2.22	2.52	2.45	2.78	2.32
31	1.45	......	3.40	......	3.45	......	2.35	2.25	......	2.50	......	2.18

a No observer.

BUTTERNUT CREEK.

DESCRIPTION.

The head waters of Butternut creek lie at elevation 1,700 feet, near the south line of Onondaga county. This stream drains a narrow basin about 24 miles in length and having an average width of about 3 miles. The stream flows in a southerly direction. Jamesville reservoir is located 14 miles below the source at elevation about 640. North of Erie canal the stream flows out into the flat lands, at elevation about 400, which border Oneida lake for a width of several miles. Butternut creek is joined by Limestone creek near North Manlius at a point about 1½ miles above its junction with Chittenango creek. Erie canal crosses the stream 4½ miles below Jamesville. Above Erie canal crossing the slopes are steep and the tributaries are mostly short laterals. Jamesville reservoir has a capacity of 170,000,000 cubic feet. The water-surface area is 252 acres. At a distance of 2.35 miles below Jamesville is a dam which diverts part of the stream to the Orrville feeder. This feeder is 2.25 miles in length.

BUTTERNUT CREEK NEAR JAMESVILLE, N. Y.

A gaging station was established on Butternut creek at the first bridge above the head of the Orrville feeder, July 25, 1907, by Robert E. Horton, for this Department. The gage is located about 2 miles below Jamesville, and measurements at this point will show the supply to the canal available from Jamesville reservoir and the Orrville feeder. A box-and-chain gage is bolted to the hand-rail of the bridge on the up-stream side. The gage scale reads from zero to 7.5 feet, and the length of the chain is 13.00. The current-meter measurements are made from the down-stream side of the bridge, using the face of the right-hand abutment as an initial point. The bridge is subdivided at two-foot intervals and the span is 40 feet. The gage is read at 7 A. M. and 6 P. M. by Marie Brandt.

Current-meter Discharge Measurements of Butternut Creek near Jamesville, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908.					
April 23...	E. C. Niles..........................	2.25	58.9	2.04	120
May 14...	E. C. Niles..........................	1.65	35.1	1.82	63.9
June 3...	E. C. Niles..........................	1.60	33.4	1.46	48.9
July 18...	A. R. Patchke..........................	1.26	21.0	1.13	23.7
Sept. 9...	A. R. Patchke..........................	0.96	14.0	0.900	12.6
Sept. 17...	A. T. Clark..........................	1.40	31.2	1.28	39.8
Oct. 2...	A. R. Patchke..........................	1.36	25.3	1.25	31.5

Mean Daily Gage Height, in Feet, of Butternut Creek near Jamesville, N. Y.

DAY.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.						
1	......	1.95	1.45	1.40	1.55	1.80
2	......	2.35	1.90	1.40	1.60	1.75
3	......	2.15	1.45	1.45	1.55	1.70
4	......	1.45	1.60	1.50	1.65	1.70
5	......	1.50	1.60	1.45	1.60	1.60
6	......	1.20	1.65	1.40	1.70	1.65
7	......	1.35	1.60	1.75	3.50	1.70
8	......	1.30	1.45	1.85	3.10	1.60
9	......	1.40	1.50	1.65	3.05	1.60
10	......	1.35	1.65	1.65	2.10	1.60
11	......	1.45	1.55	1.60	2.25	1.80
12	......	1.35	1.60	1.55	2.20	1.75
13	......	1.40	1.50	1.85	2.15	1.90
14	......	1.65	1.40	1.65	2.00	1.85
15	......	1.75	1.40	1.60	2.00	1.80
16	......	1.60	1.60	1.80	1.95	1.70
17	......	1.65	1.55	1.55	1.80	1.70
18	......	1.45	1.70	1.50	2.00	1.70
19	......	1.75	1.70	1.45	1.80	1.60
20	......	1.60	1.85	1.55	1.75	1.60
21	......	1.65	1.55	1.50	1.65	1.60
22	......	1.60	1.70	1.40	1.60	1.60
23	......	1.55	1.85	1.45	1.60	2.80
24	......	1.60	2.00	1.45	1.70	2.75
25	3.22	1.45	1.50	1.50	1.75	2.70
26	2.37	1.55	1.60	1.40	1.80	2.75
27	1.97	1.70	1.70	1.40	1.75	2.80
28	1.85	1.60	1.85	1.45	1.70	2.70
29	1.70	1.55	1.65	1.45	1.80	2.70
30	1.85	1.80	1.50	1.40	1.70	2.60
31	1.60	1.70	......	1.40	......	2.55

Mean Daily Gage Height, in Feet, of Butternut Creek near Jamesville, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1.80	1.60	2.35	2.45	2.75	1.70	1.60	1.40	1.30	1.35	1.00	1.00
2	1.75	1.50	4.65	2.40	2.70	1.60	1.60	1.50	1.40	1.30	1.00	1.85
3	1.70	1.45	4.80	2.35	2.65	1.50	1.60	1.50	1.40	0.60	1.00	1.70
4	1.80	1.40	4.55	2.25	2.60	1.50	1.60	1.50	1.45	0.70	1.00	1.70
5	1.70	1.40	3.55	2.30	2.40	1.50	1.60	1.50	1.45	0.75	1.00	1.50
6	1.70	1.40	5.00	2.35	2.50	1.00	1.60	1.50	1.35	0.70	1.00	1.50
7	1.60	1.40	4.85	2.30	2.60	1.00	1.60	1.45	1.35	0.70	0.95	0.30
8	1.60	1.40	4.20	2.25	2.75	1.00	1.60	1.40	1.25	0.75	0.90	0.35
9	1.65	1.35	4.10	2.10	3.10	1.28	1.60	1.40	0.60	0.80	0.90	0.40
10	1.65	1.35	4.10	2.30	2.95	1.28	1.60	1.40	0.95	0.80	0.90	0.50
11	1.60	1.40	4.10	2.05	2.70	1.28	1.60	1.40	1.00	1.00	0.90	0.80
12	1.60	1.45	4.00	2.10	2.60	1.28	1.50	1.30	1.00	1.00	0.95	1.00
13	1.60	2.90	4.50	2.00	2.05	1.25	1.50	1.30	1.00	1.00	0.95	0.90
14	1.70	3.80	4.60	2.05	2.35	1.00	1.40	1.30	1.01	1.00	1.00	0.90
15	1.60	5.90	4.80	2.10	2.25	1.30	1.40	1.30	1.02	1.00	0.95	1.00
16	1.50	4.55	4.95	2.05	2.00	1.20	1.30	1.30	1.02	1.00	0.95	1.00
17	1.50	3.85	4.95	2.55	1.95	1.20	1.40	1.30	1.02	1.00	0.95	1.00
18	1.40	3.80	4.75	2.40	1.95	1.20	1.60	1.30	1.02	1.00	0.95	0.90
19	1.50	3.60	4.60	2.60	1.90	1.05	1.60	1.30	1.04	1.00	1.00	0.90
20	1.50	3.55	4.50	2.40	1.75	1.20	1.60	1.30	1.02	1.00	1.00	1.00
21	1.60	3.65	4.30	2.20	1.90	1.30	1.50	1.30	1.02	0.95	1.00	1.00
22	1.65	3.60	3.15	2.35	1.90	1.60	1.50	1.30	1.02	0.95	1.00	1.00
23	1.75	4.05	2.50	2.25	1.85	1.60	1.70	1.20	1.02	1.00	0.95	1.00
24	1.95	4.15	2.45	2.20	1.75	1.60	1.70	1.20	1.00	1.00	0.90	1.15
25	1.80	3.90	2.60	2.20	1.70	1.60	1.60	1.20	1.00	1.00	0.90	1.20
26	1.70	3.60	2.85	2.35	2.05	1.60	1.50	1.20	0.95	1.00	0.90	1.20
27	1.60	3.00	2.90	2.55	1.75	1.50	1.50	1.20	0.95	0.95	0.90	1.05
28	1.60	3.10	2.90	2.50	1.65	1.50	1.50	1.00	1.00	1.00	0.90	0.80
29	1.55	3.10	2.70	2.40	1.75	1.30	1.40	1.00	1.02	1.00	0.90	0.80
30	1.60	......	2.60	2.40	1.85	1.20	1.40	1.00	1.03	0.95	0.90	0.80
31	1.60	......	2.40	......	1.80	......	1.40	1.00	......	0.95	......	0.80

GAGES ON SENECA RIVER.

Seneca river receives the drainage from the central group of lakes lying southward from Lake Ontario. The drainage basin is rolling, though not precipitous, excepting for the deep, narrow valleys crossing it, in which the lakes are situated, and certain additional valleys not at the present time occupied by lakes.

Gages have been maintained on Seneca river and its main tributaries during 1908 at the places named in the following table:

STREAM.	Location.	Distance in Miles from— Three River Point.	Station to station.	Present type of gage.
Seneca river	Three River Point *a*	0	0	Board with coppered staples.
Seneca river	Gascon reef	.9	.9	Board with coppered staples.
Seneca river	Belgium (new bridge)	1.9	1.0	Chain and plumb-bob.
Seneca river	Mud lock (foot of Onondaga outlet)	7.0	5.1	Board with coppered staples.
Onondaga outlet	Foot of lake, Long Branch	7.9	.9	Board with coppered staples.
Onondaga lake	Near Iron pier—head of lake—Syracuse	12.5	4.6	Reference point.
Seneca river	Below dam, Baldwinsville	12.4	5.4*b*	Chain and plumb-bob.
Seneca river	Above dam, Baldwinsville	12.5	0.1	Galvanized staple gage.
Seneca river	Below Jack's reef, Eel weir	20.8	8.3	Board with coppered staples.
Seneca river	Above Jack's reef, State ditch	23.2	2.4	Board with coppered staples.
Seneca river	Bonta's bridge, 1 mile west of Cross lake	26.4	3.2	Board with coppered staples.
Seneca river	Mosquito Point bridge	35.6	9.2	Board with coppered staples.
Seneca river	N. Y. C. & H. R. R. bridge, 1½ miles west of Fox Ridge	40.8	5.2	Chain and plumb-bob.
Seneca river	West Mud lock, foot of Cayuga lake	49.0	8.2	Board with coppered staples.
Clyde river	Clyde	56.4*c*	15.6*c*	Chain and plumb-bob.
Clyde river	Lyons	67.6	11.2	Chain and plumb-bob.
Ganargua creek	2 miles west of Newark	76.3	8.7	Chain and plumb-bob.
Ganargua creek	2½ miles east of Palmyra (Harrison mill)	81.0	4.7	Board gage.

a Gage on Oneida river highway bridge.
b Continuing on Seneca river.
c Leaving Seneca river at mouth of Clyde river near Montezuma 45.8 miles from Three River Point.

SENECA RIVER AT HEAD OF GASCON REEF.

A gage was established at the head of Gascon reef, about 3 miles south of Phœnix, N. Y., April 16, 1904, by this Department. The gage is vertical and consists of a board graduated from zero to 8 feet, attached to the down-stream end of the right-hand face of the wall of a culvert under the towing-path on the right-

hand bank of Seneca river about midlength of the breakwater at Gascon reef. The zero of the gage is at elevation 360.44, and readings are taken each morning by Solomon Walts.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at Head of Gascon Reef.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	365.01	362.41	363.91	365.81	364.41	363.41	361.81	361.81	361.21	360.71	361.61	361.31
2	365.01	363.51	363.91	365.81	364.61	363.31	361.71	361.81	361.11	361.11	361.51	361.31
3	365.01	363.41	364.01	365.51	364.61	363.21	361.71	361.71	360.71	360.81	361.21	361.31
4	364.81	363.51	364.01	365.31	364.71	363.01	361.71	361.61	360.91	361.01	361.11	361.31
5	*a*	363.51	363.91	365.21	364.71	362.91	361.61	361.51	360.71	361.31	361.11	361.21
6	364.61	363.41	364.01	365.21	364.51	362.81	361.71	361.51	361.31	361.11	361.01	361.41
7	364.41	363.51	364.01	365.11	364.51	362.71	361.51	361.41	361.31	361.01	361.11	361.31
8	364.21	363.51	363.91	365.21	364.81	362.71	361.51	361.21	361.21	361.91	361.41	361.31
9	364.21	363.51	364.01	365.11	364.81	362.41	361.51	362.01	361.01	361.01	361.51	361.21
10	364.11	363.61	364.01	365.01	364.81	362.31	361.51	362.11	360.91	360.91	361.41	361.21
11	364.11	363.61	364.11	365.01	365.11	362.31	361.51	362.01	361.11	361.21	361.41	361.11
12	364.01	363.51	364.21	365.01	365.31	362.31	361.41	361.91	361.11	361.21	361.31	361.31
13	364.01	363.41	364.51	365.11	364.81	362.31	361.61	361.91	361.51	361.01	361.21	361.31
14	364.01	363.31	365.11	364.91	364.81	362.31	361.51	361.81	361.41	361.01	361.31	361.01
15	364.01	364.51	365.31	364.71	364.81	363.61	361.51	361.81	361.21	361.01	361.41	361.01
16	363.91	365.31	365.51	364.71	364.91	363.21	361.51	361.91	361.11	361.01	361.31	361.01
17	363.91	365.61	365.61	364.71	364.81	363.21	361.41	362.01	361.01	361.01	361.41	360.61
18	364.01	365.51	365.51	364.61	364.81	363.11	361.61	361.71	361.11	361.11	361.31	360.31
19	363.91	365.41	365.61	364.61	364.71	363.01	361.91	361.51	361.11	361.21	361.31	360.71
20	363.71	365.41	365.81	364.61	364.71	362.91	362.01	361.61	361.41	360.81	361.41	361.01
21	363.61	365.31	365.51	364.51	364.61	362.91	362.11	361.51	361.31	360.81	361.51	360.91
22	363.61	365.21	365.71	364.61	364.61	362.81	362.41	361.41	361.21	360.71	361.61	360.81
23	363.51	365.01	365.71	364.61	364.51	362.61	362.41	361.41	361.01	361.01	361.71	360.71
24	363.51	364.91	365.61	364.51	364.41	362.41	362.41	361.61	360.81	361.01	361.61	360.81
25	363.41	364.71	365.61	364.51	364.21	362.31	362.41	361.41	360.71	361.11	361.61	361.11
26	363.31	364.51	365.61	364.41	363.91	362.31	362.41	361.31	360.51	361.31	361.51	361.01
27	363.21	364.41	365.51	364.51	363.81	362.21	362.31	361.21	360.61	361.31	361.41	361.11
28	363.21	364.61	366.01	364.51	363.71	362.21	362.31	361.21	360.81	361.21	361.41	361.21
29	363.21	364.41	366.01	364.41	363.61	362.21	362.11	361.21	360.91	361.41	361.41	361.11
30	363.11	......	366.01	364.31	363.51	362.91	362.01	361.51	360.91	361.41	361.31	360.81
31	362.81	......	365.81	......	363.51	......	361.91	361.51	......	361.41	......	360.31

a No record.

SENECA RIVER AT BELGIUM, N. Y.

A box-and-chain gage was established on the down-stream end of the right-hand pier of the bridge across Seneca river at Belgium, April 14, 1904, by this Department. The gage scale reads decimally from zero to 9 feet. The standard chain length is 20 feet and the gage datum 358.27. Readings are taken each morning by Solomon Walts.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at Highway Bridge, Belgium, N. Y.

DAY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	365.20	362.90	364.10	365.60	364.60	363.70	362.00	361.90	361.26	360.76	361.66	361.16
2	365.20	362.80	364.10	365.60	364.80	363.60	361.90	361.90	361.16	361.16	361.56	361.16
3	365.20	363.00	364.20	365.50	364.80	363.50	361.90	361.70	360.76	360.86	361.26	361.16
4	365.00	363.10	364.30	365.40	365.00	363.30	361.90	361.50	360.96	360.96	361.16	361.26
5	364.90	363.10	364.20	365.30	365.00	363.20	361.80	361.40	360.76	361.26	361.16	361.16
6	364.70	363.10	364.30	365.30	364.80	363.10	361.90	361.40	361.46	360.86	360.96	361.36
7	364.50	363.20	364.30	365.20	364.80	363.00	361.70	361.30	361.46	360.76	361.06	361.36
8	364.30	363.20	364.20	365.30	365.10	363.00	361.70	361.10	361.16	360.86	361.36	361.16
9	364.30	363.50	364.40	365.20	365.10	362.80	361.70	361.90	360.96	360.96	361.46	361.16
10	364.20	363.40	364.40	365.20	365.10	362.60	361.70	362.00	360.86	360.86	361.36	361.16
11	364.20	363.40	364.50	365.30	365.50	362.50	361.60	361.90	361.06	361.16	361.26	360.96
12	364.10	363.30	364.60	365.20	365.70	362.50	361.60	361.80	361.06	361.16	361.16	361.16
13	364.10	363.20	364.80	365.30	365.30	362.50	361.70	361.80	361.36	360.96	361.06	361.16
14	364.10	363.30	365.50	365.00	365.30	362.50	361.60	361.80	361.26	360.96	361.16	361.86
15	364.10	364.20	365.80	364.80	365.20	363.60	361.50	361.70	361.06	360.96	361.26	361.86
16	364.00	365.50	366.00	364.80	365.30	363.40	361.40	361.80	360.96	360.96	361.16	361.86
17	364.00	365.70	366.10	364.80	365.20	363.40	361.30	361.90	360.86	360.96	361.26	360.46
18	364.10	365.70	366.00	364.70	365.20	363.30	361.50	361.60	360.96	361.06	361.16	359.76
19	364.00	365.50	366.10	364.70	365.10	363.20	361.90	361.40	360.96	361.16	361.26	360.46
20	363.80	365.50	366.30	364.80	365.00	363.10	362.00	361.50	361.26	360.76	361.26	360.96
21	363.80	365.30	366.00	364.80	364.80	363.10	362.10	361.40	361.06	360.76	361.36	360.86
22	363.70	365.20	365.90	364.70	364.80	363.00	362.60	361.40	360.96	360.66	361.46	360.76
23	363.70	365.40	365.90	364.80	364.70	362.80	362.60	361.40	360.86	360.96	361.56	359.76
24	363.70	365.20	365.90	364.70	364.60	362.60	362.60	361.70	360.76	360.96	361.36	360.17
25	363.60	364.90	365.80	364.70	364.50	362.50	362.60	361.40	360.66	361.06	361.36	360.77
26	363.40	364.70	365.80	364.60	364.20	362.50	362.60	361.30	360.56	361.26	361.26	360.17
27	363.30	364.50	365.70	364.70	364.10	362.40	362.50	361.20	360.66	361.26	361.16	360.77
28	363.50	364.70	366.00	364.70	364.00	362.40	362.50	361.20	360.96	361.16	361.16	360.87
29	363.40	364.40	365.90	364.60	363.90	362.40	362.30	361.30	361.06	361.36	361.26	360.67
30	363.40	......	365.90	364.50	363.80	362.20	362.20	361.50	360.96	361.36	361.16	360.47
31	363.10	......	365.60	......	363.80	......	362.10	361.50	......	361.36	......	360.17

Current-meter Discharge Measurements of Seneca River at Belgium, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Oct. 1	Clark & Overocker	3.01	2,047	0.687	1,406
Oct. 8	Overocker & Niles	3.04	2,065	0.653	1,348
Oct. 9	Overocker & Niles	3.05	2,055	0.688	1,413

SENECA RIVER AT MUD LOCK NEAR LONG BRANCH, N. Y.

A gage was established at the junction of Oswego canal with Seneca river, April 16, 1904, by this Department. This gage also shows approximately the water-level at the junction of Seneca river and Onondaga outlet. The gage is vertical and reads from zero to 9 feet and is subdivided to tenths of feet by coppered staples. The gage zero is at elevation 360.56. Readings are taken daily by Frank Shane.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at Mud Lock near Long Branch, N. Y.

DAY.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.						
1	362.06	362.26	361.59	361.09	361.59	361.89
2	362.06	362.06	361.39	361.19	361.59	361.89
3	362.06	361.86	361.29	361.29	361.49	361.79
4	362.16	361.66	361.19	361.19	361.49	361.79
5	362.16	361.66	360.99	361.19	361.49	361.69
6	362.26	361.56	361.09	361.09	361.39	361.69
7	362.26	361.56	361.19	361.09	361.39	361.69
8	362.06	361.56	361.39	361.19	361.39	361.69
9	362.06	361.76	361.29	361.09	361.39	361.69
10	362.16	361.86	361.29	361.09	361.39	361.59
11	362.16	361.96	361.19	361.19	361.39	361.59
12	362.06	361.96	361.39	361.19	361.39	361.59
13	361.96	362.06	361.59	361.19	361.49	361.59
14	361.96	362.06	361.69	361.19	361.49	361.59
15	361.86	362.06	362.09	361.29	361.49	361.39
16	361.86	361.96	361.99	361.29	361.59	361.09
17	361.76	361.96	361.79	361.29	361.79	360.69
18	362.06	362.06	361.69	361.19	361.89	360.19
19	362.26	361.96	361.49	361.19	361.89	360.19
20	362.46	361.86	361.39	360.99	361.89	360.69
21	362.56	361.69	361.49	360.99	361.89	360.89
22	362.76	361.79	361.29	361.09	361.89	360.59
23	362.96	361.79	361.19	361.19	361.89	360.29
24	362.96	361.79	361.19	361.29	361.89	360.29
25	362.96	361.59	361.09	361.39	361.89	361.49
26	362.86	361.69	361.09	361.59	361.89	360.99
27	362.86	361.69	361.19	361.59	361.89	360.99
28	362.76	361.69	361.19	361.69	361.89	360.89
29	362.66	361.59	361.09	361.69	361.89	360.89
30	362.46	361.59	361.09	361.69	361.89	360.79
31	362.36	361.69	....	361.69	.....	360.79

ONONDAGA CREEK.

DESCRIPTION.

Onondaga lake receives the drainage from two principal tributaries, Onondaga creek and Otisco lake outlet, or Nine Mile creek. The lake is drained by a short outlet about one mile in length, entering Seneca river at Mud Lock. The outlet was formerly improved by the State for the purpose of draining lands adjoining the lake and reducing the flood level. The accompanying table shows the maximum recorded stages in the lake at various times. The fall from the foot of the lake to Seneca river is very slight. The stage is affected by a growth of aquatic plants so that the discharge from the outlet is apparently not a direct function of the stage. The stage of the lake is also affected by the stage of Seneca river. It is stated that flows in Onondaga lake usually recede before the maximum stage of Seneca river, so that at times the current in the outlet is reversed and water flows from the river into the lake. A detailed description of the drainage basin, with results of current-meter measurements made in the outlet, may be found in the report of the State Engineer and Surveyor for 1904, pages 494–501.

ONONDAGA OUTLET NEAR LONG BRANCH, N. Y.

A gage was established by this Department, April 16, 1904, in the head of Onondaga outlet. The present gage is a vertical board scale reading from zero to 9 feet, divided into tenths of feet by coppered staples. It is attached to a branching willow tree on the right bank of the outlet about 300 feet above the highway bridge, leading to Long Branch station of the Syracuse & Baldwinsville Electric railroad. Readings are taken each morning by Joseph Kennedy. The gage zero was at elevation 360.97, preceding March 27, 1907, and at elevation 361.07, beginning March 27, 1907.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Onondaga Outlet near Long Branch, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	365.97	363.77	364.97	366.37	365.47	364.37	363.07	362.67	361.97	361.87	362.07	361.87
2	365.87	363.67	364.87	366.27	365.47	364.17	362.97	362.57	361.97	361.87	362.07	361.87
3	365.87	363.57	364.87	366.17	365.57	364.07	362.87	362.47	361.97	361.87	362.07	361.87
4	365.77	363.57	364.97	366.07	365.57	363.97	362.77	362.37	361.97	361.77	362.07	361.77
5	365.67	363.57	365.07	366.47	365.57	363.87	362.77	362.37	361.97	361.77	362.07	361.77
6	365.57	363.67	365.07	366.37	365.67	363.77	362.67	362.27	361.97	361.77	362.07	361.77
7	365.47	363.67	364.97	366.27	365.67	363.67	362.57	362.17	361.97	361.77	362.17	361.77
8	365.27	363.77	364.97	366.07	365.77	363.57	362.47	362.07	361.97	361.67	362.17	361.77
9	365.07	363.87	364.87	365.97	365.77	363.57	362.47	362.07	361.97	361.67	362.17	361.67
10	364.97	363.77	364.77	365.97	365.87	363.47	362.37	362.37	361.97	361.67	362.07	361.67
11	364.87	363.77	364.77	365.87	366.07	363.47	362.37	362.37	361.97	361.67	362.07	361.67
12	364.87	363.77	364.87	365.77	366.07	363.37	362.37	362.37	361.97	361.67	362.07	361.67
13	364.87	363.87	364.87	365.67	365.97	363.37	362.27	362.37	361.97	361.67	362.07	361.67
14	364.77	364.67	364.87	365.67	365.97	363.37	362.27	362.37	361.97	361.67	362.07	361.57
15	364.77	365.47	364.97	365.57	365.87	363.57	362.27	362.37	361.97	361.67	362.07	361.57
16	364.77	366.47	364.97	365.57	365.87	363.77	362.17	362.37	361.97	361.67	362.07	361.57
17	364.67	366.67	365.07	365.47	365.87	364.07	362.27	362.27	361.97	361.67	362.07	361.57
18	364.67	366.57	365.27	365.47	365.77	364.17	362.37	362.27	361.87	361.67	362.07	361.57
19	364.67	366.47	365.37	365.47	365.67	364.07	362.37	362.27	361.87	361.67	362.07	361.57
20	364.57	366.37	365.87	365.57	365.57	363.97	362.57	362.27	361.87	361.67	362.07	361.47
21	364.57	366.27	366.17	365.57	365.57	363.87	362.97	362.27	361.87	361.67	362.07	361.47
22	364.47	366.17	366.47	365.57	365.47	363.77	362.97	362.27	361.87	361.57	362.07	361.37
23	364.37	366.07	366.77	365.47	365.47	363.67	363.07	362.27	361.87	361.57	362.07	361.27
24	364.27	365.87	366.77	365.37	365.37	363.57	363.07	362.17	361.87	361.57	362.07	361.27
25	364.27	365.67	366.77	365.27	365.27	363.57	363.17	362.17	361.87	361.67	362.07	361.27
26	364.17	365.57	366.67	365.17	365.07	363.47	363.17	362.17	361.87	361.97	362.07	361.27
27	364.17	365.57	366.67	365.17	364.97	363.37	363.07	362.07	361.87	362.07	362.07	361.27
28	364.07	365.37	366.57	365.17	364.77	363.27	363.07	362.07	361.87	362.07	362.07	361.27
29	364.07	365.17	366.57	365.27	364.67	363.17	362.97	362.07	361.87	362.07	362.07	361.27
30	363.97	......	366.47	365.37	364.57	363.07	362.87	362.07	361.87	362.07	362.07	361.27
31	363.87	......	366.37	......	364.47	......	362.77	362.07	......	362.07	......	361.27

ONONDAGA LAKE AT SYRACUSE, N. Y.

A record of the water-level of Onondaga lake at the entrance of Onondaga creek in Syracuse has been kept by this Department, beginning May 14, 1904. A chain-and-box gage was formerly maintained on the abutment of the New York Central bridge crossing Onondaga creek. A bench-mark on the angle of the down-stream side of the left-hand abutment of this bridge, consisting of a bolt-head in the bridge-seat, is at elevation 369.55. During 1908 the readings have been taken by measuring downward from a reference point.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Onondaga Lake at Syracuse, N. Y.

DAY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.*a*												
1	364.75	364.55	363.10	365.55	364.85	363.45	363.35	363.60	362.45	362.65	363.45	364.05
2	365.05	364.55	363.15	365.45	364.85	363.35	363.55	364.44	362.45	362.55	363.40	364.05
3	365.25	364.55	363.15	365.35	364.75	363.35	363.55	363.55	362.60	362.55	363.55	364.00
4	365.95	364.75	363.15	365.15	364.65	363.25	363.55	363.45	362.75	362.65	363.65	363.95
5	366.75	364.75	363.05	365.05	364.65	363.15	363.55	363.29	362.55	362.65	363.65	363.81
6	366.85	364.75	363.05	364.90	364.65	363.15	363.40	363.20	362.55	362.65	363.70	363.75
7	366.85	364.65	363.05	364.70	364.65	363.35	363.35	363.15	362.55	362.75	364.15	363.65
8	366.95	365.55	363.01	364.55	364.60	363.35	363.30	363.15	362.55	362.85	364.75	363.59
9	366.95	364.45	362.90	364.55	364.55	363.25	363.35	363.15	362.55	363.05	365.05	363.55
10	367.05	364.35	362.85	364.45	364.45	363.25	363.35	363.15	362.55	363.15	365.09	363.61
11	367.05	364.35	362.79	364.35	364.40	363.20	363.25	363.15	362.55	363.15	365.09	363.85
12	366.75	364.25	362.75	364.30	364.40	363.15	363.41	363.15	362.60	363.20	365.09	363.95
13	366.75	364.15	362.85	364.30	364.35	363.05	363.45	363.15	362.60	363.25	365.05	363.98
14	366.65	363.95	363.15	364.25	364.25	363.00	363.25	363.10	362.58	363.25	364.95	364.05
15	366.65	363.95	363.55	364.25	364.15	362.95	363.25	363.05	362.55	363.25	364.85	364.05
16	366.55	363.75	363.85	364.10	364.15	362.90	363.25	362.95	362.55	363.25	364.71	363.95
17	366.35	363.65	364.15	364.05	364.15	362.85	363.25	362.95	362.65	363.15	364.65	363.80
18	366.05	363.55	364.55	363.95	364.05	362.85	363.25	362.89	362.60	363.15	364.55	363.70
19	365.95	363.55	364.85	363.85	364.11	362.80	363.25	362.85	362.55	363.11	364.45	363.70
20	365.95	363.55	364.95	363.75	364.05	362.80	363.25	362.75	362.55	363.10	364.31	363.65
21	365.95	363.45	364.95	363.65	363.99	362.75	363.19	362.75	362.71	363.15	364.15	363.65
22	365.95	363.45	365.05	363.55	363.90	362.75	363.15	362.65	362.60	363.05	364.15	363.65
23	365.75	363.35	365.15	363.45	363.75	362.75	363.30	362.65	362.60	363.00	364.05	363.85
24	365.45	363.35	365.30	363.75	363.65	362.85	363.35	362.58	362.65	362.95	363.99	364.65
25	365.15	363.35	365.55	364.05	363.55	362.85	363.75	362.55	362.55	362.95	363.95	365.55
26	364.95	363.35	365.55	364.35	363.55	362.95	364.00	362.45	362.55	362.91	363.85	365.75
27	364.95	363.25	365.55	364.75	363.75	363.05	364.05	362.45	362.45	362.90	363.90	365.75
28	364.85	363.25	365.65	364.85	363.75	362.95	363.95	362.45	362.45	363.25	363.90	365.95
29	364.75	......	365.65	364.85	363.75	362.90	363.85	362.45	362.55	363.45	363.99	366.10
30	364.75	......	365.65	364.75	363.65	363.05	363.75	362.45	362.65	363.55	364.05	366.15
31	364.65	......	365.65	......	363.55	......	363.75	362.45	......	363.55	......	366.15

a This table supersedes that appearing in the 1907 report, p. 445, part of which is referred to incorrect datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Onondaga Lake at Syracuse, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	366.20	364.00	365.15	366.55	365.55	364.85	363.45	363.00	362.35	362.15	362.35	362.35
2	366.20	364.00	365.25	366.45	365.70	364.75	363.35	362.95	362.35	362.25	362.35	362.35
3	366.05	363.95	365.45	366.35	365.75	364.55	363.25	362.85	362.35	362.25	362.35	362.35
4	365.95	363.95	365.45	366.35	365.85	564.45	363.15	362.70	362.35	362.25	362.35	362.35
5	365.85	363.95	365.35	366.25	365.85	564.30	363.10	362.65	362.29	362.15	362.25	362.35
6	365.79	363.95	365.25	366.20	365.75	364.15	363.10	362.60	362.29	362.15	362.25	362.25
7	365.65	363.95	365.25	366.15	365.68	364.05	363.05	362.55	362.25	362.15	362.35	362.25
8	365.55	363.95	365.25	366.15	365.85	363.95	363.05	362.55	362.25	362.15	362.35	362.15
9	365.35	363.95	365.25	366.20	366.05	363.90	363.00	362.55	362.25	362.15	362.35	362.10
10	365.20	363.95	365.25	366.20	366.25	363.90	362.95	362.55	362.25	362.15	362.35	362.05
11	365.05	363.95	365.35	366.15	366.25	363.85	362.85	362.65	362.25	362.15	362.45	362.05
12	364.95	363.95	365.65	366.05	366.25	363.75	362.75	362.65	362.25	362.15	362.45	362.05
13	365.15	364.00	365.95	365.95	366.20	363.69	362.75	362.65	362.25	362.25	362.45	361.95
14	365.15	364.20	366.35	365.85	366.20	363.65	362.75	362.65	362.25	362.25	362.35	361.95
15	365.05	364.85	366.65	365.78	366.15	363.95	362.75	362.70	362.55	362.25	362.35	361.95
16	365.05	366.65	367.05	365.75	366.10	364.25	362.75	362.65	362.25	362.15	362.35	361.95
17	364.95	366.85	367.15	365.75	366.10	364.35	362.75	362.65	362.25	362.15	362.35	361.85
18	364.95	366.85	367.15	365.65	366.05	364.35	362.75	362.65	362.25	362.15	632.35	361.85
19	364.85	366.65	367.15	365.65	365.95	364.35	362.85	362.60	362.15	362.15	362.35	361.75
20	364.80	366.55	367.15	365.75	365.85	364.35	362.90	362.60	362.15	362.15	362.35	361.75
21	364.75	366.45	367.05	365.75	365.80	364.25	362.90	362.60	362.15	362.15	362.35	361.75
22	364.80	366.35	367.00	365.75	365.69	364.20	363.15	362.55	362.15	362.15	362.35	361.75
23	364.85	366.25	367.00	365.65	365.65	364.15	363.25	362.55	362.15	362.15	362.35	361.75
24	364.75	366.15	367.00	365.59	365.55	364.15	363.35	362.45	362.15	362.05	362.35	361.65
25	364.65	365.95	367.00	365.55	365.35	364.05	363.35	362.45	362.15	362.15	362.35	361.65
26	364.55	365.75	366.95	365.45	365.20	363.95	363.35	362.45	362.15	362.15	362.35	361.65
27	364.45	365.75	366.85	365.45	365.25	363.80	363.35	362.45	362.15	362.35	362.35	361.65
28	364.35	365.60	366.75	365.45	365.15	363.70	363.35	362.40	362.15	362.35	362.35	361.65
29	364.25	365.35	366.75	365.45	364.95	363.65	363.25	362.35	362.15	362.35	362.35	361.65
30	364.20	......	366.65	365.35	364.85	363.65	363.15	362.35	362.15	362.35	362.35	361.65
31	364.05	......	366.55	......	364.75	......	363.10	362.35	......	362.35	......	361.65

ONONDAGA CREEK AT TEMPLE STREET, SYRACUSE, N. Y.

A gaging station was established on Onondaga creek at Temple street bridge, Syracuse, by Guy Moulton, for this Department, January 16, 1908. The elevation of water-surface when the gage reads zero is 376.11. Observations are taken each morning and night by L. Moulton. Current-meter measurements are made from the bridge by the Syracuse Intercepting Sewer Commission.

In the fall of 1908 a coffer-dam was constructed by the Intercepting Sewer Board, which caused backwater at the Temple street gaging station, making it impossible to determine the discharge for the portion of the year not covered by the accompanying daily discharge table. The creek crosses under the Erie canal between the Temple street and Belden avenue stations, and water wasted or drawn from the canal and discharged into Onondaga creek greatly increases the flow in the creek at times, so that the record at Belden avenue does not show the natural drainage of the creek itself and is not comparable with the Temple street record, although by taking the difference between the recorded flow at the two stations on any given day the amount of water entering the creek from the Erie canal may be approximately estimated. The drainage area at the point of gaging is 108 square miles.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Onondaga Creek at Temple St., Syracuse, N. Y. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	379.90	379.25	379.76	379.74	380.71	379.01	378.64	378.43	378.29	378.24	379.02	378.86
2	......	379.17	380.27	380.03	380.99	379.31	378.56	......	378.01	378.28	378.87	378.54
3	379.85	379.10	382.02	380.11	380.62	379.17	378.58	378.43	378.15	378.48	378.48	378.22
4	......	379.16	380.64	379.95	380.49	379.10	......	378.45	378.44	378.32	379.06	378.25
5	......	379.05	379.92	379.78	380.05	379.05	378.59	378.82	378.87	378.30	378.91	378.42
6	......	380.02	380.21	380.15	379.89	379.00	378.47	378.56	378.27	378.41	378.91	378.07
7	......	379.01	380.86	379.89	380.01	378.91	378.82	378.50	378.23	378.28	......	378.66
8	379.56	379.08	380.44	380.00	380.88	378.87	378.94	378.46	378.35	378.30	379.21	378.36
9	379.64	......	380.52	380.59	380.88	378.86	379.06	378.39	378.30	378.25	379.08	378.34
10	379.42	378.96	380.06	380.17	381.30	378.95	378.61	378.43	378.27	378.31	379.17	378.14
11	379.34	379.01	379.94	380.14	381.04	378.94	378.59	378.58	378.31	......	380.57	378.21
12	379.56	379.01	381.71	380.12	380.35	378.87	378.68	378.44	378.24	378.84	379.78	378.30
13	380.47	379.14	381.74	380.00	380.07	378.78	379.14	378.41	378.31	379.02	379.85	378.31
14	380.28	380.84	382.21	379.84	379.95	378.78	378.71	378.51	378.23	379.18	......	378.30
15	379.86	383.83	381.84	379.76	380.38	379.19	378.50	378.41	378.29	378.82	379.03	378.33
16	379.74	384.11	383.04	380.60	380.05	379.15	378.56	378.38	178.27	378.92	378.76	379.05
17	379.11	381.68	381.35	380.03	379.91	378.86	378.43	378.43	378.28	378.88	379.57	378.53
18	379.65	380.38	380.71	379.89	379.81	378.75	378.61	378.40	378.29	378.84	378.99	378.46
19	379.52	380.26	380.57	.....	379.71	378.76	379.42	378.31	378.26	379.01	378.69	378.47
20	379.43	380.14	380.42	380.86	379.57	378.89	378.75	378.41	378.31	379.02	378.69	......
21	379.47	379.58	380.20	380.60	379.56	378.70	378.64	378.21	378.28	379.07	379.81	378.34
22	380.09	379.94	380.31	380.28	379.44	378.71	379.51	378.50	378.27	378.57	379.14	378.32
23	380.49	379.88	380.57	380.00	379.36	378.74	378.71	......	378.31	378.69	379.06	378.07
24	379.88	379.51	380.65	379.86	379.42	379.00	378.76	378.30	378.29	......	379.04	378.51
25	379.11	379.41	380.70	379.77	379.21	378.86	378.64	378.35	378.28	379.17	378.91	......
26	379.67	381.26	380.27	379.65	379.21	378.72	378.81	378.34	378.31	379.07	......	378.46
27	379.49	379.88	380.40	379.53	380.23	378.65	378.59	378.31	378.26	379.25	379.32	378.61
28	379.38	379.85	380.43	379.91	379.52	378.37	378.51	378.24	378.25	379.25	378.91	378.61
29	379.48	379.76	380.79	379.83	379.24	378.61	378.46	378.29	378.52	379.30	378.67	378.35
30	379.04	......	380.26	379.57	379.66	378.60	378.47	......	378.37	378.91	378.69	378.37
31	379.16	......	379.92	380.71	379.70	......	378.41	378.18	......	379.22	......	378.61

a No record on dates left blank.

Current-meter Gagings of Onondaga Creek at Temple St., Syracuse, N. Y.

DATE.	Elevation of water-surface (Syracuse city datum).	Discharge.	Gaged by.
	Feet.	*Second-feet.*	
1907.			
Dec. 30	17.37	311.4	Glenn D. Holmes.
Dec. 31	17.48	313.8	Glenn D. Holmes.
1908.			
Jan. 3	16.80	221.13	Earl D. Wood.
Jan. 8	16.43	172.91	Earl D. Wood.
Jan. 17	15.92	111.93	Earl D. Wood.
Feb. 14	17.82	396.06	Earl D. Wood.
Feb. 15	19.78	808.69	Earl D. Wood.
Feb. 17	18.10	473.58	Earl D. Wood.
Mar. 3	18.92	609.47	E. H. Weiskotten.
Mar. 3	16.65	201.00	State of New York.
June 22	15.62	72.30	E. H. Weiskotten.
Aug. 4	15.33	48.43	E. H. Weiskotten.
Aug. 24	15.20	51.79	E. H. Weiskotten.
Sept. 2	14.90	26.59	Rexford J. Lyon.

Current-meter Discharge Measurements of Onondaga Creek at Temple street, Syracuse, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet per second.*	*Second-feet.*
Feb. 29	Clark & Niles	3.65	146	1.40	205
Sept. 17	A. T. Clark	2.22	78.2	0.399	31.2
Oct. 2	A. R. Patchke	2.34	79.0	0.504	39.8

Mean Daily Discharge, Second-feet, of Onondaga Creek at Temple St., Syracuse, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.
1908.										
1	....	134	208	198	325	120	72	54	44	44
2	221	....	283	240	408	142	68	53	26	52
3	221	120	608	252	335	122	68	50	48	47
4	....	120	345	230	330	120	69	53	49	44
5	....	122	215	210	240	110	70	54	45	40
6	....	105	268	268	221	105	53	65	46	42
7	....	115	373	255	238	103	182	58	40	40
8	173	115	326	238	391	98	115	54	31	42
9	....	115	320	330	371	95	80	59	42	42
10	163	105	245	255	465	99	65	53	45	40
11	145	121	225	254	391	100	63	62	40	52
12	180	108	550	254	376	90	62	53	44	51
13	325	119	590	230	236	89	110	53	45	60
14	280	392	642	210	236	86	80	59	46	.....
15	215	1,302	550	200	285	95	85	53	50	.....
16	200	1,145	840	335	252	120	70	50	45	.....
17	120	500	485	238	221	98	56	53	44	.....
18	185	295	351	221	209	90	70	52	42	.....
19	170	274	315	350	185	85	168	51	43	.....
20	153	324	303	390	180	86	81	47	45	.....
21	160	183	268	332	175	79	80	63	44	.....
22	247	176	290	268	167	78	121	46	41	.....
23	308	173	325	238	148	80	110	45	45	.....
24	215	173	340	215	151	110	80	43	44	.....
25	....	154	348	205	135	72	70	43	45	.....
26	....	185	275	194	131	79	89	43	44	.....
27	203	450	320	154	270	76	68	43	46	.....
28	140	245	340	221	171	50	60	43	43	.....
29	181	230	374	205	133	70	56	43	59	.....
30	122	....	285	167	190	72	55	80	43	.....
31	142	....	221	....	210	....	53	26	....	.....
Mean	198	272	368	245	251	94	81	52	44	46

Monthly Discharge of Onondaga Creek at Temple St., Syracuse, N. Y.
[Drainage area, 108 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	325	120	198	1.84	2.12
February	1,302	105	272	2.52	2.72
March	840	208	368	3.41	3.93
April	390	154	245	2.27	2.54
May	465	131	251	2.32	2.67
June	142	50	94	0.87	0.97
July	182	53	81	0.75	0.86
August	80	26	52	0.48	0.55
September	59	26	44	0.41	0.46

Onondaga Creek at Belden Avenue, Syracuse, N. Y.

A gaging station was established at Belden avenue on Onondaga creek by the Syracuse Intercepting Sewer Board on March 2, 1908. The record has been furnished by Glenn D. Holmes, Chief Engineer of the Board. Results are given in the appended tables.

Current-meter Gagings of Onondaga Creek at Belden Ave., Syracuse, N. Y.

DATE.	Elevation of water-surface (Syracuse city datum).	Discharge.	Gaged by.
1908.	*Feet.*	*Second-feet.*	
Mar. 2	11.93	470.53	E. H. Weiskotten.
Mar. 5	11.03	246.95	E. H. Weiskotten.
Mar. 7	11.68	397.30	E. H. Weiskotten.
Mar. 12	12.12	526.40	E. H. Weiskotten.
April 6	11.48	355.02	E. H. Weiskotten.
Aug. 4	10.80	122.74	Rexford J. Lyon.
Aug. 5	10.95	177.31	Rexford J. Lyon.
Sept. 21	10.60	207.92	Rexford J. Lyon.

Mean Daily Discharge, Second-feet, of Onondaga Creek at Belden Ave., Syracuse, N. Y.

DAY.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.
1908.								
1	....	258	390	309	204	204	224	262
2	470	280	442	243	....	204	207	306
3	560	290	349	280	205	185	238	262
4	350	270	355	204	200	201	243	224
5	253	260	302	245	205	243	224	243
6	293	306	370	255	221	241	220	420
7	390	309	390	221	230	243	219	243
8	332	306	510	205	262	217	306	.....
9	335	352	430	260	230	220	328	.....
10	280	306	546	204	243	225	204	.....
11	268	302	410	213	221	220	236	.....
12	513	294	432	185	220	218	224	.....
13	540	280	330	260	262	205	249	.....
14	576	262	390	....	243	246	223	.....
15	540	263	368	204	255	223	330	.....
16	690	350	390	221	243	243	220	.....
17	478	285	312	200	180	201	243	.....
18	370	272	376	204	243	205	238	.....
19	348	350	335	226	306	220	219	.....
20	320	405	265	243	243	236	224	.....
21	295	376	309	221	243	220	154	.....
22	315	309	306	262	306	243	231	.....
23	348	296	256	335	258	229	213	.....
24	350	280	278	330	269	225	243	.....
25	355	264	222	221	306	220	284	.....
26	309	255	217	224	255	220	260	.....
27	330	245	330	213	223	225	220	.....
28	337	270	265	204	220	220	260	.....
29	379	262	243	207	221	225	325	.....
30	314	230	270	213	198	220	262	.....
31	280	....	285	....	230	213	....	.....
Mean	384	293	344	235	238	221	242	280

Monthly Discharge of Onondaga Creek at Belden Ave., Syracuse, N. Y.
[Drainage area, 113 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
March	690	253	384	3.40	3.91
April	405	230	293	2.59	2.90
May	546	217	344	3.04	3.50
June	335	185	235	2.08	2.33
July	306	180	238	2.11	2.43
August	246	185	221	1.96	2.25
September	330	154	242	2.14	2.40
October	....	....	280	....	....

HARBOR BROOK AT LAKEVIEW AVENUE, SYRACUSE, N. Y.

A gaging station was established on Harbor brook by the Syracuse Intercepting Sewer Board on March 12, 1908. Harbor brook is a small stream draining an area of 10 square miles and lying westerly of Onondaga creek basin. Results of the gagings of this stream are shown in the appended tables. They have been furnished for publication by Mr. Glenn D. Holmes, Chief Engineer of the Board.

Mean Daily Discharge, Second-feet, of Harbor Brook at Lakeview Ave., Syracuse, N. Y.

DAY.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.
1908.									
1	....	20	23	21	21.5	12	11.5	11.5	12
2	....	22	24	21	....	14	10	13	12
3	....	21	24	20	18	12	11	12	....
4	....	21.5	21	19	19	12	11.5	11	....
5	....	....	21	18	20	13	11.5	11.5	....
6	....	23	20	16	13	18	11	....	....
7	....	21	21	13	12	12	10	11.5	....
8	....	24	28	15	21	12	12	11	....
9	....	24	21	16	13	11.5	12	11.5	13
10	....	21	28	18	13	11.5	11.5	11	14
11	....	21	25	18	12	11.5	11.5	14	14
12	48	....	26	16	12	11	11.5	14	12
13	37	21	23	13	13	13	12	13	....
14	....	18	32	....	13	13	11.5	12	....
15	....	18	28	18	13	12	12	11.5	....
16	37	20	27	15	12	10	11.5	11.5	....
17	24	20	21	14	12	10	11.5	11.5	....
18	24	19	21	13	14	11	11	12	....
19	26	21	21	15	22	10	11.5	12	....
20	24	23	24	21	17	10	11	11.5	....
21	21.5	21	28	17	15	11	12	12	....
22	....	21.5	24	14	24	11	11.5	13	....
23	24	21	21	22	17	10	11.5	11	....
24	26	20	17	29	15	10	11.5	12	....
25	21	18	18	18	22	10	11	13	....
26	23	18	17	15	18	10	11.5	12	....
27	22	17	28	15	15	10	11	13	....
28	24	21	21.5	14	15	10	11	12	....
29	21	19	21	21.5	15	....	13	13	....
30	21	20	22	23	14	11	11	11.5	....
31	21	....	26	....	13	11.5	....	11.5	....
Mean	26	21	23	17.5	16.0	12.5	11.4	12	....

Current-meter Gaging of Harbor Brook at Lakeview Ave., Syracuse, N. Y.

DATE.	Elevation of water-surface (Syracuse city datum).	Discharge.	Gaged by.
1908			
Mar. 12	1.78	46.69	E. H. Weiskotten.
Mar. 16	1.60	42.16	E. H. Weiskotten.
Mar. 27	1.21	21.12	E. H. Weiskotten.
April 9	1.29	25.25	E. H. Weiskotten.
April 14	1.12	18.95	E. H. Weiskotten.
June 19	1.00	14.72	E. H. Weiskotten.
July 7	0.87	11.98	E. H. Weiskotten.
Aug. 3	0.88	7.67	Rexford J. Lyon.

Monthly Discharge of Harbor Brook at Lakeview Ave., Syracuse, N. Y.
[Drainage area, 10 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
March	48	21	26	2.6	3.00
April	24	17	21	2.1	2.34
May	32	17	23	2.3	2.65
June	29	13	17.5	1.75	1.95
July	24	12	16	1.6	1.84
August	18	10	12.5	1.2	1.38
September	13	10	11.4	1.1	1.22
October	14	11	12	1.2	1.38

NINE MILE CREEK, OTISCO LAKE OUTLET, NEAR MARCELLUS, N. Y.

Current-meter measurements of the discharge in Nine Mile creek and Otisco lake outlet were made in the low-water season of 1908, as shown by the accompanying table. The first measurement on October 20 and the measurement of October 22 were made at the third highway bridge crossing the stream above Marcellus, this bridge being located about two miles above that village. The second measurement of October 20 was made at the fourth bridge, about one mile up-stream from the bridge at which the other measurements were made. The outflow from the lake is subject to artificial control by mill dams located above the points of gaging.

Current-meter Discharge Measurements of Otisco Lake Outlet, Two Miles above Marcellus, N. Y.

DATE.	Hydrographer.	Gage height.*ab*	Area of section.	Mean velocity.	Discharge.	Remarks.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*	
Oct. 20	A. T. Clark	5.38	57.0	0.785	44.8	*a*
Oct. 20	A. T. Clark	4.60	32.4	1.67	54.3	2½ miles above. *b*
Oct. 22	A. T. Clark	5.35	57.2	0.809	46.3	*a*

a Reference point, bed plate, right-hand, down-stream side.
b Reference point, top of abutment, right-hand, down-stream side.

SENECA RIVER AT BALDWINSVILLE, N. Y.

This station was established November 12, 1898.* It is maintained by U. S. Geological Survey in coöperation with this De-

* By Geo. W. Rafter, for the U. S. Deep Waterways Commission.

partment. The gaging station is located at the State dam in Baldwinsville, 12.5 miles along river from the junction of Seneca river with Oneida river. These two streams unite at Three River Point to form Oswego river.

The location of the gaging station is shown on the Baldwinsville sheet, United States Geological Survey topographic map.

The discharge over the main dam is calculated by the formula for a broad, flat-crested weir when flash-boards are removed. Discharge over flash-boards is calculated by the Francis formula. Gage readings in the river channel below the dam are utilized to determine the average working head on turbines. Discharge through the three main canals is determined from records of the run of water-wheels, kept in each mill, and from the recorded lockage and opening of paddles at the Oswego canal lock at the foot of the canal.

Current-meter measurements, to determine the leakage of the several mills, have been made during 1908, as in preceding years.

Mean Daily Discharge, Second-feet, of Seneca River at Baldwinsville, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.		Nov.	Dec.
1908.									
1	6,017	2,511	4,196	. . .	6,222	4,461	35	1,300	1,850
2	6,162	1,804	4,687	. . .	5,449	4,288	35	1,908	1,761
3	6,001	2,303	4,692	. . .	4,424	4,250	.5	1,801	1,769
4	5,873	2,420	4,684	. . .	5,575	4,174	16	1,801	1,740
5	5,219	2,848	4,687	. . .	5,561	3,852	73	1,798	1,741
6	5,286	2,915	4,684		5,695	4,003	79	1,801	1,450
7	4,783	2,777	5,046		5,441	2,958	32	1,798	1,871
8	4,455	2,791	4,672	5,835	5,678	3,962	32	1,502	1,701
9	4,455	2,434	5,177	5,835	5,949	3,943	.2	2,003	1,693
10	4,332	2,709	5,229	5,828	5,164	3,756	37	2,003	1,592
11	5,175	2,891	5,427	5,789	6,078	3,758	36	1,978	1,581
12	3,756	2,921	5,937	4,822	6,338	3,568	73	1,833	1,554
13	4,470	2,951	6,192	5,310	6,518	3,237	39	1,779	1,363
14	4,583	3,105	6,172	5,052	6,262	2,385	39	1,779	1,778
15	4,603	4,474	5,788	4,803	6,258	3,878	32	1,300	1,637
16	4,541	5,117	6,873	4,797	6,239	4,296	76	1,586	1,572
17	5,732	5,586	7,072	5,055	5,164	4,494	16	1,509	1,517
18	4,161	5,372	7,188	4,913	6,128	4,472	16	1,509	1,339
19	3,573	5,649	7,269	3,944	6,002	4,344	39	1,698	1,694
20	4,800	5,632	7,269	4,838	5,872	4,348	71	1,580	1,694
21	3,445	5,497	7,217	5,059	5,742	3,772	71	1,578	1,925
22	3,588	5,309	6,550	5,459	5,738	3,407	11	1,274	1,780
23	3,293	5,007	7,032	5,315	5,460	3,202	71	1,639	1,669
24	3,109	5,305	6,892	5,356	4,414	3,212	26	1,868	1,[illegible]
25	2,965	5,055	6,612	5,325	5,330	2,824	74	1,562	633
26	2,193	5,089	6,612	4,314	5,090	2,738	34	1,353	1,[illegible]
27	2,948	5,020	6,482	5,247	5,037	2,611	34	1,808	1,242
28	2,654	4,812	6,185	5,340	4,645	2,291	34	1,606	1,772
29	2,470	4,694	5,740	5,090	4,536	2,460	35	1,121	1,513
30	2,353	.	6,168	5,090	4,485	2,684	39	1,407	1,491
31	2,145	. . .	6,042	.	3,971	. .	34	. .	1,474
Mean	4,166	3,968	5,951	5,148	5,468	3,586	31	1,685	1,594

Monthly Discharge of Seneca River at Baldwinsville, N. Y.
[Drainage area, 3,103 square miles.]

MONTH	DISCHARGE IN SECOND-FEET			RUN-OFF.	
	Maximum.	Minimum	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	6,162	2,145	4,166	1.34	1.54
February	5,649	1,804	3,968	1.28	1.38
March	7,269	4,196	5,951	1.91	2.20
April (23 days)	5,835	3,944	5,148	1.66	1.86
May	6,518	3,971	5,468	1.76	2.02
June	4,494	2,291	3,588	1.16	1.30
July	3,093	1,507	2,479	0.799	0.919
August	2,273	526	1,674	0.539	0.620
September	1,648	653	1,258	0.405	0.450
October	2,035	1,284	1,661	0.535	0.615
November	2,003	1,121	1,635	0.527	0.590
December	1,925	633	1,594	0.514	0.591

SENECA RIVER BELOW BALDWINSVILLE DAM.

The gage below the dam at Baldwinsville was established to determine the head at the mills in connection with the record of discharge, and is also used to determine the elevation of water-surface. A box-and-chain gage is located on the up-stream side of the D., L. & W. railroad bridge near the left-hand end of the bridge. The standard datum of the gage is at elevation 361.75; the chain length 12.77 feet. Gage readings are taken each morning and night.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River below Baldwinsville Dam

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a No observer.

SENECA RIVER ABOVE BALDWINSVILLE DAM.

The elevation of water-surface above Baldwinsville dam is determined from the readings of the crest gage, which was established for the purpose of gaging the discharge. The gage is vertical and reads from zero to 8 feet and is divided to feet and tenths by galvanized staples. It is attached to the down-stream face of the river wall at the up-stream end of the left-hand abutment of the dam. The zero mark of the gage is at elevation 372.27, which is also the elevation of the masonry crest of the dam. When the water is drawn below the crest level the readings are taken by measuring downward from the zero mark on the gage. Gage readings are taken each morning and night.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River above Baldwinsville Dam

DAY.	Jan	Feb.	March.	April.	May.	June.	
1908.							
1	375 37	373 27	374 22	a	374 37	374 07	3
2	375 32	373 42	374 17	a	374 47	373 97	3
3	375 27	373 12	374 17	a	374 47	373 87	3
4	375 25	373 29	374 17	a	374 52	373 82	3
5	375 27	373 37	374 17	a	374 52	373 67	3
6	375 07	373 42	374 17	a	374 57	373 72	3
7	374 87	373 42	374 29	a	374 47	373 77	3
8	374 72	373 35	374 47	374 67	374 57	373 67	3
9	374 72	373 62	374 37	374 67	374 67	373 67	3
10	374 67	373 32	374 39	374 67	374 77	373 57	3
11	374 95	373 39	374 47	374 67	374 77	373 57	3
12	374 77	373 42	374 67	374 67	374 87	373 47	3
13	374 69	373 45	374 77	374 52	374 87	373 47	3
14	374 77	373 59	374 85	374 37	374 77	373 47	3
15	374 75	374 05	374 95	374 27	374 77	373 77	3
16	374 72	374 62	375 05	374 27	374 77	373 97	3
17	375 15	374 59	375 15	374 37	374 77	373 97	3
18	374 37	374 52	375 19	374 32	374 72	373 92	3
19	374 47	374 62	375 22	374 32	374 67	373 87	3
20	374 65	374 59	375 22	374 32	374 62	373 87	3
21	374 09	374 55	375 22	374 37	374 57	373 87	3
22	374 12	374 49	375 22	374 52	374 57	373 72	3
23	374 02	374 62	375 17	374 47	374 47	373 62	3
24	373 92	374 45	375 12	374 47	374 47	373 62	3
25	373 85	374 35	375 02	374 47	374 37	373 47	3
26	373 87	374 32	375 02	374 47	374 27	373 52	3
27	373 79	374 29	374 97	374 47	374 27	373 52	3
28	373 67	374 25	374 95	374 47	374 12	373 47	3
29	373 59	374 19	374 97	374 37	374 07	373 42	3
30	373 52		374 89	374 37	374 07	373 42	3
31	373 37		374 65		374 27		3

a No observer

SENECA RIVER AT FOOT OF JACK'S REEF.

A gage was established on Seneca river below Jack's Reef, April 20, 1904, by this Department. The gage is attached to a willow tree on the left bank of the stream and is located a few hundred feet below the entrance of the State ditch and also below a series

of eel weirs at Jack's Reef. The gage is vertical and reads from zero to 9 feet and is subdivided to tenths by coppered staples. Readings are taken by Frank Burns at 8 A. M. each day.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at Foot of Jack's Reef.a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	376.10	376.00	375.20	376.30	375.90	374.70	374.40	374.10	......	373.30	373.90	......
2	376.30	376.00	375.10	376.10	375.90	......	374.50	374.00	373.00	373.30	373.90	374.70
3	376.60	......	......	375.90	375.80	374.60	374.50	373.90	373.00	373.30	......	374.70
4	376.90	376.30	375.30	375.80	375.70	374.50	374.60	......	373.10	373.50	374.30	374.60
5	377.10	376.20	375.30	375.70	......	374.50	374.60	374.10	373.10	373.60	374.30	374.50
6	......	376.20	375.30	375.60	375.70	374.60	374.60	374.30	373.10	......	374.40	374.40
7	377.20	376.10	375.20	......	375.60	374.70	......	374.30	373.10	373.70	374.60	374.30
8	377.40	375.90	375.20	375.50	375.60	374.70	374.50	374.30	......	373.50	374.80	......
9	377.50	375.70	375.10	375.40	375.50	......	374.50	374.20	373.30	373.80	375.00	374.30
10	377.40	......	......	375.30	375.40	374.60	374.50	374.00	373.20	373.80	......	374.30
11	377.30	375.80	375.10	375.20	375.30	374.50	374.50	......	373.30	373.90	375.30	374.50
12	377.20	375.80	375.00	375.20	......	374.40	374.50	373.90	373.30	374.00	375.30	374.70
13	......	375.70	375.10	375.20	375.30	374.40	374.50	373.60	373.40	......	375.30	374.80
14	377.30	375.70	375.30	......	375.30	374.30	......	373.50	373.30	374.10	375.20	374.90
15	377.20	375.60	375.60	375.30	375.20	374.20	374.60	373.40	......	373.90	375.10	......
16	377.10	375.50	375.90	375.20	375.20	......	374.60	373.30	373.30	374.00	375.00	374.60
17	376.90	......	......	375.10	375.30	374.20	374.60	373.20	373.20	373.90	......	374.60
18	376.70	375.60	376.40	375.00	375.30	374.10	374.60	......	373.20	373.90	374.80	374.80
19	376.50	375.50	376.50	374.90	......	374.00	374.60	373.30	373.20	373.80	374.70	374.90
20	......	375.50	376.60	374.80	375.30	374.20	374.50	373.30	373.10	......	374.60	375.00
21	376.60	375.40	376.40	......	375.20	374.20	......	373.20	373.30	373.80	374.70	375.00
22	376.50	375.40	376.30	374.80	375.10	374.40	374.60	373.20	......	373.70	374.70	......
23	376.40	375.30	376.40	374.70	375.00	......	374.60	373.20	373.60	373.70	374.60	375.00
24	376.30	......	......	374.80	374.90	374.40	374.60	373.20	373.40	373.60	......	375.40
25	376.20	375.40	376.50	375.00	374.80	374.40	374.80	......	373.30	373.50	374.50	375.80
26	376.10	375.30	376.40	375.20	......	374.40	374.80	373.20	373.40	373.30	374.50	376.10
27	......	375.30	376.40	375.50	375.00	374.30	374.70	373.10	373.50	......	374.50	376.30
28	376.30	375.20	376.40	......	375.00	374.40	......	373.10	373.40	373.90	374.50	376.40
29	376.20	......	376.40	375.80	374.90	374.40	374.60	373.10	......	373.90	374.60	......
30	376.10	......	376.40	375.80	374.90	......	374.40	373.10	373.60	373.90	374.70	376.60
31	376.10	......	......	......	374.80	......	374.30	373.10	......	373.90	......	376.70

a This table supersedes that appearing in 1907 report, p. 450, which is referred to incorrect gage datum; no record on days left blank.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at Foot of Jacks' Reef.

DAY	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	376 6	374 7	375 9	376 6	375 8	37	.6	374 7	373 9	373 6	373 2	372.6
2	376 7	376 0	375 9	376 6	375 8	37	5	374 6	373 9	373 6	373 1	372 5
3	376 7	376 0	375 9	376 6	375 9	37	.5	374 6	373 9	373 5	373 0	372.5
4	376.6	375 8	375 9	376 5	375 9	37	5	374 5	373 9	373 5	373 0	372 5
5	a	375 6	375 9	376 5	375 9	37	.5	374.4	373 8	373 5	372 9	372.5
6	376 1	375 4	375 9	376 4	375 9	37	.6	374 5	373 8	373 3	372 9	372.5
7	376 0	375 2	376 0	376 3	376 0	37	5	374 5	373 9	373 2	372 9	372.7
8	375 9	375 1	376 1	376 3	376 0	37	6	374 4	373 8	373 2	373 0	372.6
9	375 8	375 1	376 1	376 2	376 1	37	.6	374 4	373 8	373.2	373 0	372.5
10	375 8	375 0	376 0	376 1	376 1	37	.5	374 4	373 8	373 2	373 0	372.3
11	376.1	375.0	376 0	376 0	376 2	37	.4	374 4	373 7	373 2	373 0	372.2
12	375 8	374 9	376 1	376 0	376 3	37	.4	374 3	373 8	373 2	373 0	372.2
13	375 7	374 8	376 3	375 9	376 4	37	5	374 3	373 8	373 1	373 0	372.2
14	375 9	374 8	376 5	375 8	376 5	37	.4	374 3	373 8	373 1	372 9	372.5
15	375 8	375 6	376 7	375 8	376 5	37	3	374 2	373 6	373 1	373 0	372.2
16	375 7	376 5	377 0	375 8	376 5	37	.2	374 3	373 6	373 1	373 0	372.1
17	375 7	376 6	377 2	375 8	376 5	37	2	374 3	373 6	373 1	372 9	372.5
18	375 8	376 6	377 3	375 8	376 5	37	.4	374 2	373 6	373 1	372 R	372 6
19	375 6	376 7	377 4	375 8	376 3	37	.6	374 2	373 6	373 1	372 8	372 5
20	375 5	376 8	377 4	375 8	376 2	37	.8	374 2	373 4	373 0	372 8	372.5
21	375 3	376 8	377 4	375 8	376 1	37	1	374 1	373 4	373 0	372 8	372.5
22	375 3	376 7	377 3	375 9	376 0	37	3	374 0	373 4	373 0	372 8	372.2
23	375 2	376 6	377 3	375 9	376 0	37	4	374 1	373 4	373 0	373 0	372.0
24	375 2	376 4	377 2	375 9	375 8	37	4	374 1	373 4	373 0	372 8	372.0
25	375 1	376 3	377 1	375 9	375 7	37	4	374 0	373 4	373 0	372 8	372 0
26	374 9	376 2	376 9	375 9	375 6	37	4	374 0	373 4	373 1	372 7	372 0
27	375 3	376 2	376.9	375 8	375 5	37	3	373 9	373 4	373 0	372 9	372 0
28	375 2	376 1	376 8	375 8	375 4	37	2	373 9	373 4	373 1	372 7	372.0
29	374 9	376 0	376 8	375 7	375 3	37	1	373 9	373 5	373 1	372 7	371.9
30	374 7	. .	376 7	375 7	375 2	37	0	373 9	373 6	373 2	372 7	371.9
31	374 8	. .	376 7	. . .	375 2	.	.	374 0	. . .	373 2	.....	372.0

a No record.

SENECA RIVER ABOVE JACK'S REEF.

A gage was established on the Seneca river above Jack's Reef and near the head of the State ditch, April 20, 1904, by this Department. Several gages have been used. The readings have been taken during 1907 from a vertical gage attached to a large tree on the right-hand bank of the stream below the old coffer-dam at the head of the State ditch. During 1907 the water fell below the zero mark of the gage at times and the record for the low-water period is approximate only. The bench-mark used to determine the elevation of the gage zero is a nail in the root of a large poplar tree, to which the gage is attached. The bench-mark is at elevation 382.482.

The gage datum has frequently been changed. During 1907 it was as follows: April 20, 1906, to March 24, 1907, 374.81; March 25 to May 17, 1907, 377.07; May 18, 1907, to December 31, 1908, 375.44. Readings are taken each morning by John P. Watts. The gage is located one-half mile below the outlet of Cross lake and is about 4 miles north of the village of Jordan.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River above Jack's Reef near Jordan, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov	Dec.
1908.												
1	379.64	376.74	378.44	380.04	379.04	377.94	376.44	376.24	375.34	374.64	374.94	374.64
2	379.74	376.84	378.44	379.94	379.04	377.84	376.34	376.14	375.34	374.74	374.94	374.64
3	379.74	376.94	378.44	379.94	379.04	377.74	376.24	376.04	375.34	374.64	374.94	374.64
4	379.64	376.94	378.54	379.84	379.04	377.64	376.24	375.94	375.34	374.64	374.94	374.64
5	*a*	376.94	378.64	379.74	379.14	377.54	376.24	375.84	375.34	374.64	374.94	374.64
6	379.44	376.94	378.54	379.74	379.24	377.44	376.24	375.84	375.34	374.64	374.94	374.54
7	378.94	376.84	378.64	379.64	379.34	377.34	376.24	375.84	375.34	374.64	374.84	374.54
8	378.44	376.84	378.84	379.54	379.44	377.24	376.34	375.84	375.34	374.64	374.74	374.54
9	378.34	376.74	378.94	379.44	379.44	377.24	376.24	375.84	375.34	374.54	374.74	374.44
10	378.34	376.74	378.94	379.34	379.54	377.14	376.14	375.84	375.34	374.54	374.74	374.44
11	378.24	376.74	379.14	379.24	379.64	377.14	376.04	375.84	375.34	374.54	374.74	374.34
12	378 14	376.74	379.34	379.14	379.64	377.04	375.94	375.84	375.24	374.44	374.74	374.34
13	378.24	376.74	379.64	379.04	379.74	377.04	375.94	375.74	374.94	374.44	374.74	374.24
14	378.24	376.94	379.84	379.04	379.84	377.04	375.84	375.74	374.84	374.44	374.74	374.24
15	378.24	377.24	380.04	378.94	379.84	377.34	375.84	375.74	374.74	374.44	374.74	374.24
16	378.24	377.34	380.44	378.94	379.74	377.74	375.84	375.74	374.64	374.34	374.74	374.24
17	378.24	377.34	370.74	378.84	379.74	378.04	375.84	375.74	374.64	374.34	374.74	374.14
18	378.24	377.34	380.94	378.94	379.64	378.04	376.14	375.64	374.64	374.34	374.74	374.14
19	378.14	*a*	381.04	379.04	379.54	377.84	376.24	375.64	374.54	374.34	374.74	374.14
20	378.04	*a*	381.04	379.04	379.44	377.64	376.54	375.64	374.54	374.34	374.74	374.04
21	378.04	*a*	381.04	379.04	379 24	377.44	376.74	375.54	374.54	374.44	374.74	374.04
22	378.04	379.24	380.94	379.04	379.14	377.34	377.04	375.54	374.44	374.44	374.74	373.94
23	377.94	379.14	580.84	379.04	379.04	377.24	377.24	375.54	374.44	374.44	374.64	373.94
24	377.84	379.04	380.74	379.04	378.94	377.14	377.24	375.54	374.44	374.44	374.64	373.94
25	377.64	378.94	380.64	378.94	378.84	376.94	377.24	375.44	374.44	374.54	374.64	373.84
26	377.44	378.84	380.54	378.94	378.64	376.84	377.24	375.44	374.44	374.64	374.64	373.84
27	377.34	378.74	380.44	378.94	378.44	376.74	377.14	375.44	374.44	374.74	374.64	373.84
28	377.24	378.64	380.44	378.94	378.34	376.74	376.94	375.34	374.44	374.74	374.64	373.84
29	377.14	378.54	380.34	378.94	378.24	376.64	376.74	375.34	374.54	374.84	374.64	373.84
30	377.04	......	380.24	378.94	378.14	376.54	376.44	375.34	374.64	374.84	374.64	373.84
31	376.94	......	380.04	......	378.04	......	376.34	375.34	......	374.94	......	373.84

a No record.

SENECA RIVER AT HIGHWAY BRIDGE ABOVE CROSS LAKE.

A gage was erected May 1, 1904, by H. U. Lyon of this Department at the highway bridge, commonly known as "Iron Bridge," over the Seneca river about one-half mile above Cross lake, for the purpose of obtaining a record of the fluctuation of the water-surface of the river at this point and of Cross lake. The elevation of water-surface is practically the same, there being very little appreciable slope in the river between the lake and the gaging station, except, perhaps, in time of high water.

The gage is a vertical board, graduated in feet and tenths, and is fastened to a willow tree on bank of river, on up-stream side of bridge, about 20 feet from south abutment, with its zero mark at elevation 373.79. Observations of the stage of the stream are taken daily by Mark Quinby.

The current of the stream is sluggish, especially during low water, but quite uniform. The river channel is of mud and straight for a considerable distance each way from the bridge.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River near Cross Lake.

DAY.
1908.
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SENECA RIVER AT MOSQUITO POINT BRIDGE.

A gage was established at Mosquito Point bridge on Seneca river by this Department, April 21, 1904. Beginning in 1907, a vertical gage attached to a post set in the reed beds at the left-hand side of the stream above the bridge has been used. The gage is divided decimally by burned marks and reads from zero to 9 feet. The zero mark was at elevation 372.81, May 12, 1906, to April 28, 1907, and at elevation 375.85, beginning April 28, 1907. The water level fell below the gage zero at times during 1907 and the record is defective during the low-water period. Readings are taken each morning by William Prettie. The gage is located 3 miles north of Port Byron and is just below the entrance of Owasco lake outlet to Seneca river. Current-meter measurements of discharge at this bridge during 1908 are shown in the accompanying table.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at Mosquito Point Bridge.

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Current-meter Discharge Measurements of Seneca River at Mosquito Point Bridge.

DATE.	Hydrographer.	Gage height.	Area of section	Mean velocity	Discharge.
1908.		*Feet.*	*Square feet*	*Ft. per second.*	*Second-feet.*
Sept. 30.	Overocker and Clark	—0 28	442	2 44	1,078
Oct. 7.	Overocker and Niles	—0 50	441	2 50	1,102
Oct. 9.	Overocker and Niles	—0 50	441	2.57	1,135

SENECA RIVER AT N. Y. C. R. R. BRIDGE NEAR FOX RIDGE, SAVANNAH P. O., N. Y.

This gage is located on the N. Y. C. railroad bridge crossing Seneca river and Montezuma marsh 1¼ miles west of Fox Ridge station. The gage was established by this Department, May 4, 1904. Readings are taken each morning by J. H. Rupert, engineer in the adjacent pumping station. The gage is located on the ties of the up-stream track at the left-hand side of the stream. A box-and-chain gage is used. The elevation of water-surface, when the gage reads zero, is 376.50. The chain length is 14.34 feet.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at N. Y. C. R. R. Bridge near Fox Ridge, Savannah P. O., N. Y.

DAY	Jan.	Feb.	March.	April.	May	June.	July	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	382 20	380 10	381 80	382 40	381 30	381 10					80	377 20
2	382 20	380 00	381 70	382 40	381 60	381 00					70	377 40
3	382 10	380 00	381 70	382 30	381 80	380 90					70	377 40
4	382 00	380 00	381 70	382 30	381 90	380 80					70	377 40
5	381 90	380 10	381 60	382 20	381 90	380 70					60	377 30
6	381 70	380 20	381 60	382 10	381 90	380 60					70	377 10
7	381 60	380 30	381 70	382 00	382 00	380 40					80	377 10
8	381 50	380 40	381 60	381 90	382 00	380 70					[illegible]	377 10
9	381 40	380 [illegible]	381 60	381 90	382 10	380 20					70	377 40
10	381 30	380 [illegible]	381 70	381 50	382 30	380 40					70	377 [illegible]
11	381 10	380 20	381 80	381 [illegible]	382 40	380 30					70	377 30
12	381 00	380 20	381 90	381 70	382 50	380 10					60	377 20
13	381 00	380 40	382 10	381 70	382 50	379 90					[illegible]	377 10
14	381 10	380 70	382 30	381 60	382 50	379 80					60	377 00
15	381 10	381 30	382 50	381 50	382 40	380 30					60	376 90
16	381 00	382 20	383 10	381 50	382 40	381 20					50	376 90
17	381 00	382 40	383 40	381 40	382 40	381 30					50	376 80
18	380 90	382 50	383 50	381 40	382 30	381 20					50	376 80
19	380 80	382 50	383 60	381 30	382 30	381 00					40	376 80
20	380 70	382 50	383 50	381 40	382 20	380 90					30	376 90
21	380 60	382 40	383 40	381 50	382 20	380 60					30	376 90
22	380 60	382 40	383 20	381 60	382 10	380 30					30	377 30
23	380 50	382 30	383 10	381 60	382 00	380 20					30	377 20
24	380 50	382 20	383 00	381 60	381 90	380 10					30	377 10
25	380 40	382 10	382 90	381 50	381 80	380 20					30	377 00
26	380 70	382 10	382 90	381 50	381 70	380 20					20	377 00
27	380 60	382 00	382 80	381 40	381 60	380 10					10	377 00
28	380 50	382 00	382 70	381 30	381 50	380 00					10	376 80
29	380 40	381 90	382 70	381 20	381 40	379 90					00	377 00
30	380 30		382 60	381 20	381 30	379 80					10	376 80
31	380 20		382 50		381 20							376 90

SENECA RIVER AT FOOT OF CAYUGA LAKE.

A gage was established by this Department, October 10, 1905, at west Mud Lock, which is at the junction of Seneca river, Cayuga lake and Cayuga and Seneca canal, about 3 miles east from Seneca Falls. A vertical painted gage, reading from zero to 6 feet, is nailed to the docking at the left-hand end of the towing-path bridge crossing Seneca river at the foot of the lake. Readings are taken each morning by Ed. Jones. The gage was defective during part of the year and record for lower stages during 1908 is approximate only.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Seneca River at the foot of Cayuga Lake.a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	383.36	383.56	383.96	384.76	384.66	384.86	383.96	383.66	383.66	383.36	382.36	381.66
2	383.46	383.46	384.06	385.06	384.56	384.66	383.86	383.76	383.66	383.26	382.46	381.66
3	383.56	383.36	383.96	384.96	384.76	384.76	383.96	383.66	383.56	383.26	382 36	381.56
4	383.46	382.46	384.16	384.86	384.46	384.56	383.86	383.76	383.46	383.16	382.26	381.66
5	383.66	382.56	384.06	385.06	384.56	384.66	383.76	383.66	383.46	383.16	382.26	381.56
6	383.76	382.66	384.16	384.76	384.66	384.56	383.86	383.56	383.36	383.06	382.36	381.56
7	383.86	382.56	384.16	384.66	384.56	384.46	383.86	383.46	383.46	382.96	382.26	381.46
8	383.76	382.66	384.26	384.56	384.46	384.56	383.96	383.56	383.36	382.76	382.16	381.36
9	383.66	382.76	384.16	384.46	384.66	384.46	383.86	383.46	383.26	382.76	382.26	381.46
10	383.56	382.86	384.36	384.76	384.76	384.36	383.76	383.46	383.26	382.86	382.16	381.56
11	383.66	382.76	384.46	384.86	384.66	384.36	383.86	383.56	383.36	382.76	382.06	381.66
12	383.56	382.86	384.56	384.36	384.86	384.46	383.96	383.46	383.26	382.86	382.06	381.56
13	383.46	382.96	384.46	384.26	384.76	384.36	383.76	383.46	383.26	382.86	382.16	381.56
14	383.56	383.06	384.56	384.46	384.86	384.26	383.86	383.56	383.16	382.76	382.06	381.66
15	383.66	383.16	384.66	384.66	384.96	384.46	383.86	383.66	383.26	382.76	381.96	381.66
16	383.46	383.36	384.86	384.36	385.16	384.36	383.76	383.56	383.16	382.66	381.96	381.56
17	383.56	383.46	385.06	384.46	385.06	384.26	383.66	383.56	383.06	382.76	381.86	381.66
18	383.66	383.66	385.06	384.26	385.06	384.16	383.76	383.46	383.16	382.66	381.76	381.56
19	383.56	383.56	385.16	384.46	384.96	384.16	383.76	383.46	383.16	382.66	381.86	381.56
20	383.76	383.76	385.16	384.46	385.06	384.06	383.66	383.66	383.26	382.56	381.76	381.46
21	383.86	383.86	385.26	384.66	384.96	384.16	383.76	383.56	383.36	382.66	381.86	381.36
22	383.76	383.96	385.06	384.76	384.96	384.26	383.86	383.66	383.26	382.66	381.96	381.46
23	383.66	383.86	385.16	384.46	385.06	384.16	383.76	383.76	383.36	382.76	381.96	381.36
24	383.76	383.86	385.16	384.36	384.86	384.06	383.86	383.66	383.06	382.66	381.86	381.26
25	383.46	383.96	384.96	384.46	384.86	384.16	383.76	383.66	383.16	382.76	381.96	381.36
26	383.56	384.06	385.26	384.36	384.76	384.06	383.66	383.56	383.16	382.66	381.96	381.26
27	383.36	383.96	384.86	384.26	384.86	383.96	383.66	383.46	383.26	382.76	381.86	381.26
28	383.46	383.86	384.86	384.36	384.86	384.06	383.76	383.76	383.26	382.76	381.86	381.36
29	383.36	383.86	384.76	384.26	384.96	383.96	383.76	383.66	383.36	382.46	381.76	381.46
30	383.26	.....	384.86	384.46	384.86	384.06	383.66	383.66	383.46	382.26	381.96	381.46
31	383.46	.....	384.86	.....	384.76	....	383.56	383.56	.....	382.36	.....	381.36

a Below west Mud Lock, this record shows lake level.

CAYUGA LAKE AT ITHACA, N. Y.

A gaging station was established by E. C. Murphy at the head of Cayuga lake, August 6, 1905. A staff gage is used, attached to the wall of the breakwater, about 150 feet from the light-house. Gage readings are taken once each day during the open season, and once a week durirg the winter by Fred Thomas. This gage is maintained by the U. S. Geological Survey in coöperation with this Department.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Cayuga Lake at Ithaca, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1		383.22						383.97				
2					384.62							
3										383.32		
4	383.87			385.22			383.92					
5									383.77			381.72
6						384.52						
7			382.87								382.57	
8		382.92						384.02				
9					384.82							
10										383.22		
11	383.72			384.72			383.87					
12									383.62			381.67
13						384.42						
14			384.52								382.27	
15		383.42						384.02				
16					385.12							
17										383.07		
18	383.62			384.52			383.82					
19									383.67			381.72
20						384.62						
21			385.22								382.12	
22		382.97						383.87				
23					384.77							
24										382.92		
25	383.57			384.42			384.07					
26									383.42			381.52
27						384.07						
28			385.17								381.87	
29		382.72			384.72			383.82				
30												
31										383.02		

KEUKA LAKE OUTLET NEAR DRESDEN, N. Y.

A current-meter measurement of the flow in Keuka lake outlet was made during the low-water season of 1908, as shown in the tabulation given below. A gaging was made at the highway bridge crossing the outlet about 1½ miles up-stream from Dresden. The flow in the outlet is artificially controlled by mills located along its course between Penn Yan and Dresden.

Current-meter Discharge Measurements of Keuka Lake Outlet One and One-half Miles above Dresden, N. Y.

DATE.	Hydrographer.	Gage height. a	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908. Oct. 21	A. T. Clark	9.20	62.30	2.12	132

a Reference point is painted arrow on top of left-hand abutment, down-stream side.

CLYDE RIVER AND GANARGUA CREEK.

DESCRIPTION.

Clyde river joins Seneca river in the Montezuma marsh near the foot of Cayuga lake. Clyde river is formed by the junction of Canandaigua outlet and Ganargua creek, at Lyons. Its total length is about 20 miles and the greater portion of its course lies through a broad, marshy valley. Ganargua creek proper rises near Victor. Its course is northeasterly to Macedon. It then flows easterly, winding broadly through the system of duplicate valleys extending easterly from Macedon. The principal tributary of Ganargua creek is Mud creek, which rises in the hilly region near the head of Canandaigua lake and flows northward about 20 miles, entering Ganargua creek at Victor. Ganargua creek is often called Mud creek throughout its course to Lyons. The valley through which it flows is, however, called Ganargua valley. The tributary drainage is of the characteristic glacial kame type and the tributaries are rather sparse, flowing oftentimes first north and then south between elongated hills, until they find their way to Ganargua creek.

CLYDE RIVER AT CLYDE, N. Y.

A gage was established at Sodus street bridge in the village of Clyde, October 20, 1905, by E. V. R. Payne, of this Department. A gage of the box-and-chain type is used. The scale is divided decimally from zero to 8 feet. The elevation of water-surface, when the gage reads zero, is 380.00. The chain length is 22.09. The gage is located on the down-stream side of the central span of the bridge. The bridge has a total length between abutments of 174 feet. It is subdivided into 5-foot sections on the down-stream side for current-meter measurements, the initial point being the face of the right-hand abutment. Readings are taken each day by J. F. Wickham.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Clyde River at Clyde, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	386.2	383.0	383.7	384.6	383.9	382.9	381.5	381.5	381.5	381.4	381.4	381.2
2	385.6	383.2	383.7	384.5	384.8	382.8	381.5	381.5	381.5	381.4	381.3	381.3
3	384.7	383.4	384.1	384.3	385.0	382.6	381.4	381.5	381.5	381.4	381.3	381.3
4	384.0	383.5	384.4	384.1	384.8	382.4	381.4	381.5	381.5	381.4	381.3	381.2
5	384.0	383.5	384.2	384.0	384.2	382.2	381.8	381.6	381.5	381.4	381.3	381.2
6	383.9	383.2	384.2	383.9	384.1	382.1	381.7	381.6	381.4	381.4	381.2	381.1
7	383.9	383.0	384.6	383.8	384.1	382.0	381.6	381.6	381.4	381.4	381.2	381.0
8	383.4	382.9	385.5	383.7	384.8	381.9	381.5	381.6	381.5	381.4	381.2	381.0
9	383.1	382.8	385.9	383.7	385.1	381.8	381.5	381.6	381.5	381.3	381.3	380.9
10	383.0	382.8	386.1	383.8	385.6	381.8	381.5	381.6	381.5	381.3	381.3	380.9
11	382.9	382.7	386.1	383.6	385.9	381.6	381.4	381.6	381.5	381.4	381.4	380.9
12	382.9	382.7	386.8	383.4	385.9	381.5	381.4	381.6	381.5	381.4	381.5	380.9
13	383.8	382.7	388.3	383.4	385.2	381.5	381.5	381.7	381.5	381.3	381.5	381.0
14	384.1	383.4	389.1	383.4	384.8	381.4	381.5	381.6	381.4	381.3	381.4	381.0
15	383.7	386.3	388.8	383.4	384.5	383.7	381.5	381.6	381.4	381.2	381.4	381.0
16	383.5	386.7	388.8	383.3	384.8	384.7	381.5	381.6	381.4	381.2	381.4	381.0
17	383.3	389.7	388.8	383.5	384.6	384.1	381.5	381.7	381.5	381.2	381.3	381.1
18	383.2	389.6	388.2	383.2	384.4	383.1	382.0	381.6	381.5	381.2	381.3	381.1
19	382.8	388.6	387.3	383.2	384.3	382.6	382.6	381.6	381.5	381.2	381.3	381.1
20	382.5	387.6	386.4	383.7	384.1	382.2	382.4	381.6	381.5	381.2	381.4	381.1
21	382.5	386.5	385.9	384.0	384.0	381.8	382.2	381.6	381.5	381.2	381.4	381.1
22	382.6	385.6	385.5	383.9	383.9	381.6	383.0	381.6	381.5	381.2	381.4	381.1
23	383.3	385.0	385.4	383.6	383.8	381.5	383.2	381.6	381.5	381.3	381.3	381.1
24	382.9	384.5	385.4	383.5	383.5	382.1	382.7	381.6	381.5	381.3	381.3	381.1
25	382.9	384.1	385.3	383.5	383.4	382.2	382.5	381.6	381.5	381.3	381.3	381.1
26	382.9	384.1	385.2	383.4	383.3	382.0	382.3	381.6	381.5	381.5	381.3	381.1
27	382.9	384.3	385.1	383.3	383.2	381.8	382.1	381.5	381.5	381.6	381.3	381.1
28	382.9	384.3	385.0	383.2	383.1	381.7	381.9	381.5	381.4	381.5	381.3	381.1
29	382.9	384.0	384.9	383.1	382.9	381.6	381.9	381.5	381.5	381.6	381.3	381.1
30	383.0		384.8	383.0	382.8	381.5	381.7	381.5	381.6	381.5	381.3	381.1
31	383.0		384.8	...	383.0	...	381.7	381.5	....	381.5	381.3	381.1

Current-meter Discharge Measurements of Clyde River at Clyde, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
April 8	Niles and Patchke	3.80	654	1.43	937
May 11	Patchke and Gilbert	5.96	991	2.90	2,870
May 12	Patchke and Gilbert	5.88	973	2.65	2,575
May 13	Patchke and Gilbert	5.40	899	2.28	2,053
May 13	Patchke and Gilbert	5.24	876	2.28	1,998
May 28	E. C. Niles	3.75	637	1.34	853
July 16	A. R. Patchke	1.59	340	0.691	235
Sept. 16	A. T. Clark	1.54	343	0.458	157
Sept. 30	A. R. Patchke	1.64	357	0.690	246

CLYDE RIVER AT LYONS, N. Y.

A gage was established at Geneva street bridge in the village of Lyons, September 25, 1905, by this Department. The gage is of the weight-and-box type and is attached to the down-stream side of the bridge on the right-hand span. The gage is divided decimally from zero to 14 feet. The elevation of the water-surface, when the gage reads zero, equals 390.00. Standard chain length 18.72. Readings are taken at 1 P. M. each day by men from the Barge canal office at Lyons. The gage is located below the inflow of Canandaigua outlet. The down-stream side of the bridge is subdivided at 5-foot intervals for current-meter measurements, the initial point being the face of the left-hand abutment.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Clyde River at Lyons, N. Y.

	Aug.	Sept.	Oct.	Nov	Dec.
1	91 50	391 40	391 00	391 20	391 20
2	91 60	391 40	390 90	391 10	391 20
3	91 60	391 40	390 90	391 20	391 10
4	91 60	391 40	390 90	391 20	391 00
5	91 60	391 30	390 90	391 10	390 90
6	91 80	391 30	390 90	391 00	391 00
7	91 40	391 20	390 90	391 10	391 00
8	91 60	391 10	390 90	391 10	391 10
9	91 50	391 10	390 90	391 10	391 00
10	91 40	391 00	390 90	391 10	391 00
11	91 40	390 90	390 90	391 10	390 90
12	91 50	391 00	390 90	391 50	390 70
13	91 50	391 10	390 80	391 40	390 70
14	91 50	391 10	390 80	391 40	390 70
15	91 40	391 20	390 80	391 20	390 90
16	91 50	391 20	390 80	390 70	390 90
17	91 50	391 20	390 80	390 90	390 90
18	91 50	391 20	390 80	391 00	391 00
19	91 50	391 20	390 80	391 10	391 00
20	91 40	391 30	390 80	391 10	390 90
21	91 50	391 40	390 80	391 00	390 90
22	91 40	391 05	390 80	391 00	390 90
23	91 40	390 85	390 80	391 00	390 90
24	91 40	390 80	390 80	391 10	390 90
25	91 60	391 00	390 90	391 10	390 90
26..	91 50	391 10	390 90	391 00	390 90
27 .	91 40	391 00	391 00	391 00	390 80
28	91 50	390 95	391 10	390 90	390 80
29	91 40	390 90	391 20	390 60	390 80
30	91 40	390 80	391 30	390 80	390 80
31	91 40		391 30		390.80

a No record

Current-meter Discharge Measurements of Clyde River at Lyons, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet*	*Ft per second.*	*Second-feet*
April 7.	Niles and Patchke	2.94	412	1 57	648
May 11.	Patchke and Gilbert	6 52	1,068	2 17	2,322
May 12.	Patchke and Gilbert	5 20	818	1 82	1,491
May 13..	Patchke and Gilbert	4 11	651	1 82	1,186
May 28. .	E. C. Niles	2 45	359	1 44	516
June 12.	A. R Patchke .	1.29	168	0 970	163
July 15.	A. R. Patchke	1 70	236	0 678	160
Sept. 16.	A. T. Clark	1 45	186	0 608	113
Oct. 1	A. R. Patchke	0 90	114	0 791	90.5
Oct. 10.	E. C Niles .	0 85	102	0 645	65.8

Current-meter Discharge Measurements of Erie Canal near Lyons, N. Y.

DATE.	Hydrographer.	Meter Number	Area of section.	Mean velocity	Discharge.
1908.			*Square feet*	*Ft. per second*	*Second-feet.*
June 12..	A. R. Patchke	764	500	0 097	48 7
June 14.	A. R Patchke	764	405	0 237	94 1
July 16.	A R. Patchke	462	429	0 156	67 0
Aug. 19.	A. R. Patchke.	360	434	0 209	90 9

GANARGUA CREEK NORTH OF NEWARK, N. Y.

A gaging station was established on the highway bridge 1½ miles up-stream from Newark railroad station, November 29, 1905, by James Kelly, for the Department. A box-and-chain gage, reading from zero to 13.9 feet, is attached to the down-stream side of the bridge. The elevation of water-surface, when the gage reads zero, is 406.00; chain length 15.02. Current-meter measurements were formerly made at this bridge. The bridge is located at a bend in the stream and the banks are overflowed during high water. Readings are taken about noon each day by Wm. J. Swartz. A bench-mark located on the west wing wall of Peck's highway bridge crossing the Erie canal 1.9 miles west of Newark consists of a chiseled square, the elevation of which is 449.767.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Ganargua Creek North of Newark, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	410.6	408.7	409.1	409.8	*a*	408.7	408.1	408.8	407.3	407.7	408.4	407.9
2	409.8	408.7	409.5	409.4	*a*	408.6	408.2	408.8	407.3	407.7	408.4	407.8
3	409.6	408.6	410.0	409.3	*a*	408.5	408.1	408.7	407.2	407.6	408.5	407.8
4	409.7	408.6	410.2	409.1	*a*	408.2	408.0	408.7	407.3	407.6	408.6	407.8
5	409.5	408.5	409.8	409.0	*a*	408.0	408.3	408.5	407.3	407.6	408.5	407.7
6	409.1	408.5	409.6	408.9	*a*	407.9	408.2	408.3	407.5	407.7	408.5	407.7
7	409.0	408.5	409.4	408.8	*a*	408.0	408.2	408.1	407.6	407.7	408.6	407.6
8	408.8	408.6	412.4	408.9	*a*	407.9	408.0	407.9	407.7	407.7	408.5	407.6
9	408.6	408.7	411.8	409.0	*a*	407.8	408.0	407.7	407.7	407.8	408.5	407.7
10	408.5	408.6	411.3	409.2	*a*	407.9	407.7	407.6	407.7	407.8	408.4	407.6
11	408.5	408.5	412.1	409.3	*a*	407.7	407.4	407.6	407.6	407.8	408.3	407.5
12	408.6	408.4	413.2	409.2	*a*	407.6	407.8	407.7	407.6	407.9	408.4	407.5
13	408.8	408.6	414.2	409.1	*a*	407.5	407.7	407.8	407.5	407.8	408.4	407.5
14	408.9	409.2	413.8	409.0	*a*	407.6	407.6	407.8	407.5	407.8	408.5	407.6
15	408.9	413.8	414.4	409.0	*a*	410.6	407.4	407.9	407.6	407.7	408.7	407.6
16	408.7	416.0	414.7	408.9	*a*	411.4	407.6	407.8	407.7	407.7	408.7	407.5
17	408.6	414.8	413.4	408.7	*a*	411.0	407.6	407.9	407.7	407.8	408.6	407.5
18	408.7	413.2	412.6	408.9	*a*	410.2	407.8	407.9	407.8	407.8	408.6	407.5
19	408.8	411.8	411.9	*a*	*a*	409.0	408.4	407.8	407.8	407.7	408.5	407.4
20	408.8	411.0	411.4	*a*	*a*	408.7	408.6	407.7	407.9	407.8	408.7	407.5
21	408.9	410.6	410.0	*a*	*a*	408.5	408.9	407.6	407.8	407.8	408.7	407.6
22	408.9	410.2	410.0	*a*	*a*	408.3	409.4	407.5	407.7	407.7	408.6	407.7
23	409.0	409.8	410.1	*a*	408.6	408.2	409.1	407.5	407.6	407.7	408.6	407.7
24	408.9	409.6	410.3	*a*	408.6	408.8	408.9	407.5	407.6	407.7	408.5	407.6
25	408.7	409.3	410.2	*a*	408.4	409.0	408.9	407.5	407.5	407.8	408.4	407.6
26	408.8	409.4	410.2	*a*	408.4	410.1	409.1	407.4	407.5	407.8	408.2	407.7
27	408.7	409.4	410.3	*a*	408.3	409.2	409.0	407.4	407.6	407.9	408.1	407.7
28	408.7	409.3	410.4	*a*	408.4	408.8	409.0	407.4	407.5	408.0	408.0	407.8
29	408.8	409.2	410.4	*a*	408.3	408.4	408.9	407.3	407.6	408.0	408.0	407.9
30	408.8	....	410.3	*a*	408.5	408.2	408.8	407.4	407.7	408.2	407.9	408.0
31	408.7	....	410.2	.....	408.6	.....	408.9	407.4	.....	408.2	.....	407.9

a No record.

GANARGUA CREEK NEAR PALMYRA, N. Y.

A gaging station was established at Harrison's mill between Palmyra and East Palmyra for this Department in 1907. The dam is of timber and has main crest of 44.2 feet in length ob-

structed by two piers and in addition a wing spillway 31.1 feet in length. The elevation of the water-surface deduced from the daily reading taken above the dam is shown in the accompanying table.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Ganargua Creek near Palmyra, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	423.13	422.33	422.63	422.83	423.18	422.53	422.18	422.03	421.23	421.93	422.13	422.13
2	422.93	422.33	422.78	422.73	423.73	422.53	422.13	422.13	421.83	421.88	422.08	422.03
3	422.83	422.38	423.33	422.63	423.28	422.28	421.98	421.93	422.03	421.88	422.03	421.93
4	422.63	422.33	422.93	422.63	422.98	422.23	421.98	421.98	421.98	421.93	422.03	422.03
5	422.53	422.33	422.93	422.58	422.78	422.13	421.98	421.93	421.93	421.93	422.08	422.03
6	422.53	422.23	423.03	422.58	422.68	422.08	421.93	421.98	421.88	421.98	422.13	421.88
7	422.38	422.23	423.63	422.58	422.93	422.08	422.03	421.98	421.88	421.98	422.18	422.03
8	422.48	422.23	423.83	422.98	423.33	421.98	421.93	422.08	421.83	421.98	422.18	421.83
9	422.48	422.33	423.48	422.73	423.83	421.98	421.73	422.03	421.93	421.88	422.18	422.48
10	422.48	422.28	423.23	422.63	424.03	422.08	421.83	421.93	421.73	421.88	422.23	422.13
11	422.38	422.33	423.23	422.68	423.53	422.03	421.88	421.98	421.68	421.93	422.28	422.13
12	422.43	422.28	424.98	422.63	423.13	422.03	421.93	421.88	421.73	422.03	422.28	421.88
13	423.33	422.33	424.73	422.68	422.78	421.98	421.93	421.08	421.73	422.08	422.28	421.93
14	422.98	424.03	424.83	422.53	422.83	422.03	421.98	422.23	421.93	421.93	422.18	421.93
15	422.88	425.78	424.63	422.58	423.13	423.68	421.93	422.13	422.03	421.93	422.08	421.98
16	422.83	425.93	425.28	422.53	422.93	423.28	421.88	421.93	421.73	421.88	422.23	421.93
17	422.78	424.33	423.68	422.63	422.73	422.83	421.93	422.03	421.50	421.88	422.23	421.73
18	422.53	423.48	163.68	422.58	422.63	422.53	422.33	422.08	421.63	422.03	422.13	421.93
19	422.53	423.43	423.38	422.73	422.58	422.43	422.63	421.98	421.73	422.03	422.28	421.98
20	422.33	422.93	423.03	423.03	422.63	422.28	422.48	421.95	421.78	421.98	422.13	421.93
21	422.43	422.93	422.98	423.18	422.58	422.28	422.48	422.53	421.73	421.88	422.13	421.93
22	422.98	422.83	422.98	422.88	422.63	422.13	423.43	422.03	421.83	421.83	422.08	421.88
23	422.73	422.73	423.28	422.68	422.63	422.18	422.88	422.03	422.03	421.83	422.03	421.93
24	422.58	422.78	423.23	422.58	422.58	422.68	422.63	421.98	422.08	421.93	422.03	421.88
25	422.63	422.78	423.03	422.48	422.33	422.63	422.53	421.83	422.03	422.03	422.13	421.83
26	422.63	422.63	423.03	422.43	422.33	422.53	422.33	421.53	421.93	422.18	422.23	421.93
27	422.58	422.78	422.98	422.38	422.43	422.33	422.33	421.68	421.93	422.28	422.28	422.03
28	422.63	422.73	423.18	422.38	422.43	422.23	422.28	421.83	421.88	422.23	422.23	422.03
29	422.58	422.73	423.13	422.43	422.18	422.18	422.13	421.73	421.88	422.28	422.23	422.08
30	422.43	.....	422.93	422.43	422.23	422.18	422.23	421.63	421.93	422.23	422.13	422.23
31	422.43	.....	422.83	.....	422.48	.....	422.08	421.68	.....	422.23	.....	422.03

CANANDAIGUA OUTLET.

DESCRIPTION.

Canandaigua lake occupies one of the elongated depressions extending in nearly a north and south direction in the central lake region of New York. The drainage tributary to the lake is chiefly short lateral streams from the steep slopes of adjacent hillsides. The outflow from the lake is regulated to some extent by gates constructed by the State. The lake is at elevation about 686. From the foot of the lake at Canandaigua the outlet flows a little north to Manchester, a distance of 7 miles. In this distance a fall of 100 feet occurs, which is chiefly concentrated at several water-power dams. From Manchester the stream flows easterly 12 miles and thence northeasterly 8 miles joining Ganargua creek at Lyons to form the Clyde river. In the easterly portion of its course the stream winds with large bends through a broad sloping valley of

fertile land. The fall is mostly utilized at water-power dams. The tributary drainage is moderately rolling and is interspersed with glacial kames. These are lenticular hills extending usually in a north and south direction. At Phelps, Flint creek, which is the largest tributary, enters the outlet. Flint creek drains a valley similar to the adjacent lake basins. This valley is not at present occupied by a lake, but contains an extensive swamp, reaching several miles southward from Gorham.

CANANDAIGUA OUTLET AT ALLOWAY, N. Y.

This gaging station was established September 18, 1906, by F. P. Williams for this Department. It is located at a highway bridge crossing the stream 2½ miles above Lyons. The gage has a vertical scale divided decimally and reading from zero to 11 feet. It is attached to the down-stream face of the left-hand abutment of the bridge and has its zero mark at elevation 403.45. Current-meter discharge measurements are made from the down-stream side of the bridge, which has a span of 95 feet between abutments.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Canandaigua Outlet at Alloway, N. Y.a

DAY.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.										
1	......	405.57	406.02	404.52	404.32	403.92	403.32	403.67	403.77	404.02
2	......	405.67	405.82	404.52	404.32	403.92	403.42	403.67	403.72	404.02
3	406.12	405.67	405.52	404.52	404.32	403.92	403.32	403.62	404.02	404.02
4	405.92	405.02	405.52	404.52	404.32	403.92	403.42	403.72	403.87	404.02
5	405.42	405.12	405.32	404.52	404.32	403.92	403.42	403.67	403.77	404.02
6	405.72	405.02	405.32	404.72	404.32	403.92	403.32	403.77	403.62	404.02
7	405.22	404.92	405.22	404.52	404.32	403.92	403.32	403.67	404.82	403.97
8	405.22	404.82	404.92	404.32	404.32	403.92	403.42	403.77	404.82	403.87
9	405.02	404.82	404.92	404.32	404.32	403.92	403.42	404.02	404.57	403.87
10	404.92	405.02	404.92	404.32	404.32	403.72	403.42	403.87	404.57	404.02
11	405.02	405.12	404.92	404.32	404.32	403.72	403.47	403.82	404.32	404.22
12	405.32	405.42	404.92	404.32	404.32	403.52	403.52	403.72	404.22	404.07
13	406.07	405.22	404.92	404.32	404.32	403.52	403.42	403.72	404.22	404.32
14	408.82	405.12	404.92	404.32	404.32	403.32	403.37	403.72	404.22	403.92
15	407.82	405.02	404.92	404.32	404.32	403.32	403.32	403.77	404.02	403.82
16	406.72	404.92	405.02	404.32	404.12	403.32	403.32	403.77	404.02	403.92
17	408.57	405.02	405.12	404.32	404.12	403.32	403.32	403.72	404.02	404.02
18	407.82	404.92	404.82	404.32	404.12	403.32	403.32	403.87	404.17	404.22
19	406.62	404.92	404.82	404.32	404.12	403.32	403.42	403.72	404.17	404.27
20	406.42	404.92	404.82	404.32	404.12	403.32	403.42	403.67	404.12	404.12
21	405.62	404.82	404.72	404.32	404.12	403.52	403.42	403.72	404.02	404.07
22	406.02	404.72	404.72	404.32	404.32	403.52	403.42	403.72	404.12	404.17
23	406.37	405.02	404.62	404.32	404.32	403.52	403.52	403.77	404.02	404.82
24	406.32	405.82	404.52	404.32	404.32	403.52	403.52	403.72	403.97	407.02
25	405.72	405.92	404.52	404.32	404.32	403.52	403.57	403.67	403.92	407.52
26	405.62	406.22	404.82	404.32	404.32	403.32	403.62	403.62	403.87	406.32
27	405.67	406.82	404.82	404.32	404.12	403.62	403.62	403.67	404.22	406.72
28	406.37	406.42	404.72	404.32	403.92	403.42	403.47	403.82	404.22	408.12
29	406.02	406.02	404.72	404.32	403.92	403.52	403.62	403.72	404.22	407.22
30	405.57	405.92	404.72	404.12	403.82	403.52	403.67	403.72	404.17	406.82
31	405.57	......	404.72	404.32	403.82	403.52	......	403.62	......	406.72

a This table supersedes that appearing in State Engineer's report for 1907, page 461, which is referred to incorrect gage datum.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Canandaigua Outlet at Alloway, N. Y

DAY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	406 02	406 02	405 92	405 72	406 82	405 22	404 02	403 72	403 52	403 52	403 72	403 62
2	405 82	405 02	406 02	405 82	406 72	405 12	403 92	403 72	403 52	403.52	403 72	403 52
3	405 62	405 32	406 22	405 52	406 32	405 12	403 92	403 72	403 52	403 52	403 72	403 52
4	405 42	405 22	406 22	405 62	406 02	405 02	403 92	403 92	403 52	403 52	403 72	403 52
5	404 82	405 22	406 22	405 42	405 82	404 92	404 42	403 72	403 52	403 52	403 52	403 52
6	404 57	405 02	406 42	405 62	405 72	404 92	404 02	403 72	403 52	403 52	403 52	403 52
7	404 82	405 22	407 42	405 22	406 02	404 72	403 92	403 72	403 47	403 52	403 52	403 52
8	404 82	405 12	407 62	405 42	406 62	404 72	403 92	403 52	403 47	403 52	403 52	403 52
9	404 92	405 22	407 22	405 62	407 42	404 62	403 92	403 52	403 42	403 52	403 52	403 52
10	404 87	405 22	406 52	405 42	407 02	404 42	403 72	403 52	403 42	403 52	403 52	403 52
11	404 77	405 22	406 92	405 32	407 22	404 32	403 82	403 62	403 52	403 52	403 52	403 52
12	405 02	405 22	408 62	405 32	406 02	404 12	403 72	403 62	403 52	403 52	403 92	403 52
13	405 92	405 82	408 22	405 32	406 22	404 12	403 72	403 52	403 47	403 52	403 72	403 52
14	405 52	406 22	408 52	405 22	406 32	404 12	403 92	403 52	403 52	403 52	403 72	403 52
15	405 02	410 02	408 82	405 32	406 32	406 82	403 92	403 52	403 52	403 52	403 52	403 52
16	405 07	410 02	409 12	405 32	406 22	405 52	403 82	403 52	403 72	403 52	403 52	403 72
17	405 12	409 82	407 22	405 72	406 12	404 62	403 82	403 72	403 72	403 52	403 52	403 72
18	405 02	409 02	407 02	405 02	406 12	404 52	404 82	403 72	403 62	403 52	403 72	403 92
19	404 87	408 22	406 62	405 52	405 92	404 42	404 82	403 72	403 52	403 42	403 72	403 72
20	405 02	407 62	406 12	405 82	405 82	404 32	404 42	403 72	403 52	403 42	403 72	403 52
21	405 52	407 42	406 42	405 72	405 72	404 12	404 32	403 47	403 52	403 52	403 72	403 52
22	405 82	406 82	406 02	405 72	405 72	404 12	405 32	403 42	403 52	403 52	403 72	403 52
23	405 22	406 42	406 22	405 42	405 72	404 32	404 42	403 52	403 52	403 42	403 72	403 52
24	404 82	406 22	406 22	405 62	405 52	404 62	404 22	403 62	403 52	403 42	403 72	403 52
25	404 87	406 22	406 22	405 72	405 32	404 42	404 32	403 62	403 52	403 52	403 72	403 52
26	405 22	406 62	406 02	405 72	405 32	404 22	404 32	403 62	403 52	404 32	403 72	403 62
27	405 07	406 42	406 02	405 62	405 32	404 12	404 32	403 62	403 52	404 22	403 72	403 52
28	405 12	406 22	406 22	405 32	405 32	404 12	404 02	403 62	403 52	404 32	403 72	403 52
29	405 12	406 02	406 12	405 32	405 12	404 12	403 92	403 52	403 82	404 12	403 72	403 52
30	405 12		405 92	405 42	405 12	404 02	403 92	403 52	403 72	404 02	403 72	403 72
31	404 92		405 92		405 32		403 92	403 52		403 92		403 62

Mean Daily Discharge, Second-feet, of Canandaigua Outlet at Alloway, N. Y.

a Estimated.

Monthly Discharge of Canandaigua Outlet at Alloway, N. Y.
[Drainage area, 440 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	800	318	473	1.08	1.24
February	2,800	429	1,089	2.475	2.67
March	2,350	754	1,180	2.68	3.08
April	710	429	580	1.32	1.48
May	1,600	454	835	1.90	2.18
June	1,200	185	337	0.766	0.858
July	513	117	209	0.475	0.546
August	161	61	95.7	0.218	0.251
September	138	61	81.0	0.184	0.206
October	258	61	101	0.230	0.264
November	161	76	105	0.239	0.268
December	117	76	78.6	0.179	0.206

Current-meter Discharge Measurements of Canandaigua Outlet at Alloway, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1907.					
April 10	Niles and Davis	1.60	298.0	1.27	378.0
June 5	E. C. Niles	1.00	255.0	0.95	242.0
June 20	E. C. Niles	0.95	230.0	0.93	215.0
Aug. 15	E. C. Niles	0.35	189.0	0.41	78.0
Sept. 25	E. C. Niles	0.05	151.0	0.328	49.5

Current-meter Discharge Measurements of Canandaigua Outlet at Alloway, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908.					
April 7	Niles and Patchke	2.0	350	1.43	502
May 13	E. C. Niles	3.08	450	2.00	902
May 28	E. C. Niles	2.00	348	1.33	464
June 12	Horton and Patchke	0.84	237	0.819	194
July 16	A. R. Patchke	0.50	205	0.566	116
Sept. 16	A. T. Clark	0.25	167	0.467	77.5
Oct. 1	A. R. Patchke	0.26	168	0.405	67.9
Oct. 11	E. C. Niles	0.20	163	0.368	60.2

SKANEATELES LAKE.

Skaneateles Lake Outlet at Willow Glen, N. Y.

Skaneateles lake outlet enters Seneca river above Cross lake, crossing the Erie canal at Jordan. The fall from the foot of the lake to this point is 465 feet.

The surface of the lake has an elevation of 865 feet above tide. The valley on each side of the lake has an average width of 2.5 miles, and in this distance there is a rise of 400 to 800 feet, the greater part of it being within a mile of the lake. The inflow to the lake is through numerous short lateral feeders flowing down these slopes. The drainage areas of the lake are shown below:

Drainage Areas of Skaneateles Lake. [a]

	Square miles.
Land surface above State dam at Skaneateles	60.25
Water surface of lake at Skaneateles	12.75
Total drainage area above foot of lake (water surface = 17.46 per cent.)	73.00
Total area above Willow Glen weir	74.25
Area above Erie canal at Jordan	93.00

The station was established March 10, 1895. It is located in the village of Willow Glen, 1.5 miles below the foot of Skaneateles lake.

Observation is made of the daily discharge over a thin-edged weir, having a crest length of 27 feet, with two end contractions. The discharge is calculated from the observed depth on a stake set with its top at crest level, 5.2 feet up-stream from the weir, by means of the Francis formula, including corrections for end contractions and velocity of approach.

Since July 1, 1894, the water-supply of the city of Syracuse has been drawn from Skaneateles lake, and the amount of this diversion should be added to the discharge over Willow Glen weir to obtain the total run-off of the drainage basin. The calculated diversion, as determined from the record of gate openings and head at the inlet gates, using the formula for orifices with a constant coefficient stated as 0.62, has been furnished by the city of Syracuse. The observations at the weir and gates were taken by Edward Conron.

A complete description of earlier gagings of this stream is contained in the report of the State Engineer of New York, supplement for 1902, pages 61–76.

[a] Areas here given have been taken from proceedings in condemnation of water-powers on Skaneateles outlet. The lake and its tributary area are shown on the Skaneateles, Tully, Cortland and Moravia topographic atlas sheets of the United States Geological Survey.

Daily Discharge, Second-feet, of Skaneateles Lake Outlet at Willow Glen, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	61.5	56.5	56.5	122.0	119.0	133.0	91.0	85.3	85.3	82.4	82.4	82.4
2	56.5	56.5	58.9	122.0	119.0	106.0	91.0	85.3	85.3	82.4	82.4	82.4
3	56.5	56.5	61.5	122.0	106.0	106.0	91.0	106.0	85.3	82.4	82.4	82.4
4	56.5	56.5	58.9	82.4	119.0	106.0	91.0	106.0	85.3	82.4	82.4	82.4
5	56.5	56.5	61.5	91.0	119.0	106.0	88.0	106.0	85.3	82.4	82.4	82.4
6	56.5	56.5	82.4	91.0	127.0	106.0	88.0	106.0	85.3	82.4	82.4	82.4
7	56.5	56.5	82.4	94.0	127.0	100.0	88.0	106.0	85.3	82.4	82.4	82.4
8	56.5	56.5	77.0	94.0	127.0	100.0	88.0	106.0	85.3	82.4	82.4	82.4
9	56.5	53.8	77.0	94.0	133.0	94.0	88.0	106.0	82.4	82.4	82.4	37.2
10	56.5	53.8	77.0	94.0	130.0	88.0	88.0	106.0	82.4	82.4	82.4	37.2
11	56.5	51.4	77.0	94.0	140.0	88.0	88.0	106.0	82.4	82.4	82.4	37.2
12	56.5	51.4	82.4	97.0	140.0	88.0	88.0	94.0	82.4	82.4	82.4	37.2
13	56.5	51.4	85.3	94.0	140.0	88.0	88.0	94.0	82.4	82.4	82.4	37.2
14	56.5	56.5	85.3	94.0	140.0	94.0	85.3	85.3	82.4	82.4	82.4	37.2
15	56.5	66.5	91.0	106.0	140.0	94.0	85.3	85.3	82.4	82.4	82.4	37.2
16	56.5	61.5	85.3	106.0	133.0	94.0	85.3	88.0	82.4	82.4	82.4	37.2
17	56.5	56.5	82.4	100.0	140.0	85.3	88.0	85.3	82.4	82.4	82.4	37.2
18	56.5	56.5	82.4	97.0	140.0	85.3	91.0	85.3	82.4	82.4	82.4	37.2
19	56.5	56.5	82.4	110.0	140.0	85.3	94.0	85.3	82.4	82.4	82.4	37.2
20	56.5	56.5	82.4	106.0	140.0	85.3	100.0	85.3	82.4	82.4	82.4	37.2
21	56.5	56.5	82.4	100.0	140.0	85.3	106.0	85.3	82.4	82.4	82.4	37.2
22	56.5	56.5	91.0	94.0	136.0	85.3	94.0	85.3	82.4	82.4	82.4	37.2
23	56.5	56.5	91.0	113.0	136.0	88.0	85.3	85.3	82.4	82.4	82.4	37.2
24	56.5	56.5	91.0	113.0	133.0	88.0	85.3	85.3	82.4	82.4	82.4	53.8
25	56.5	56.5	91.0	113.0	133.0	85.3	85.3	85.3	82.4	82.4	82.4	53.8
26	56.5	56.5	94.0	113.0	133.0	85.3	85.3	85.3	82.4	82.4	82.4	53.8
27	56.5	56.5	106.0	113.0	133.0	85.3	85.3	85.3	82.4	82.4	82.4	53.8
28	56.5	56.5	113.0	113.0	133.0	85.3	85.3	85.3	82.4	85.3	82.4	53.8
29	56.5	56.5	113.0	113.0	133.0	85.3	85.3	85.3	82.4	82.4	82.4	46.4
30	56.5	......	113.0	113.0	133.0	85.3	85.3	85.3	82.4	82.4	82.4	48.9
31	56.5	......	122.0	......	133.0	.....	85.3	85.3	......	82.4	......	(48.9)

Current-meter Discharge Measurements of Skaneateles Lake Outlet at Willow Glen, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Dis-charge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
June 29a..	D. M. Wood	24	......	0.86	72.5
June 29a..	D. M. Wood	24	......	0.86	74.6
May 6...	D. M. Wood	27.5	53.1	1.17	138
May 6...	D. M. Wood	27.5	51.2	1.17	131
Aug. 16...	Brett and Allen	28.5	37.6	1.00	91.2

a Measurements made at second bridge above weir.

Monthly Discharge of Skaneateles Lake Outlet at Willow Glen, N. Y. a
[Drainage area, 74.2 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	In outlet.	Through conduit.	Total.	Per square mile.	Depth in inches on drainage area.
1908.					
January	56.7	18.4	75.1	1.01	1.16
February	56.3	18.6	74.9	1.01	1.09
March	85.0	19.0	104.0	1.40	1.61
April	104.0	19.0	123.0	1.66	1.85
May	132.0	19.0	151.0	2.04	2.35
June	93.0	19.0	112.0	1.51	1.68
July	88.8	19.0	108.0	1.46	1.68
August	92.0	19.0	111.0	1.50	1.73
September	89.2	19.0	108.0	1.37	1.53
October	82.5	19.0	102.0	1.87	1.58
November	82.4	19.0	101.0	1.36	1.52
December	52.6	19.0	71.6	0.965	1.11
The year	84.0	18.9	103.0	1.39	18.89

a Including diversion for water-supply of Syracuse.

OWASCO LAKE.

Owasco Lake near Auburn, N. Y.

Measurements of the outflow from Owasco lake during the extreme low water of 1908 were obtained as shown in the accompanying table. The measurements were taken by current-meter at the highway bridge located about one-quarter mile below the lake. At the time of measurement the water-level at the State dam, about one mile down-stream was drawn down to such an extent that there was apparently no interference, or backwater, at the foot of the lake, so that the measurements probably indicated the natural flow in the outlet channel at the corresponding stage. The drainage area at the point of gaging is 194 square miles.

Current-meter Discharge Measurements of Owasco Lake Outlet near Auburn, N. Y.

DATE.	Hydrographer.	Gage height.*a*	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Oct. 20	A. T. Clark	12.32	78.5	0.855	67.1
Oct. 22	A. T. Clark	12.4	76.6	0.873	66.9

a Reference point on tie-bar, six feet out from left-hand abutment, down-stream side of bridge.

NIAGARA RIVER DRAINAGE.

GENERAL FEATURES.

Niagara river connects lakes Erie and Ontario. It receives the drainage from Tonawanda creek and adjacent smaller areas in New York.

ERIE CANAL AT CHANGE BRIDGE, PENDLETON, N. Y.

A gage was established January 30, 1905, by this Department at Change bridge crossing the Erie canal just east of the junction of the canal with Tonawanda creek at Pendleton. A vertical gage with painted division marks is attached to the piling of the left-hand side of the stream near the down-stream side of the bridge. The gage reads from 12 to 18 feet. The reading of the gage, added to 560.00, gives the elevation of water-surface. Readings are taken each afternoon by Jacob Snell, Jr.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Erie Canal at Pendleton, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	573.18	570.80	570.50	570.78	571.95	571.25	571.05	570.80	571.15	570.75	571.28	570.80
2	572.00	570.64	570.48	571.48	572.00	571.40	571.00	571.50	571.00	570.65	571.10	571.20
3	571.18	570.60	570.38	571.20	572.05	571.50	571.00	571.60	571.00	570.80	571.20	571.95
4	571.10	570.20	570.40	571.10	572.08	571.20	571.28	571.10	571.05	571.00	571.00	571.55
5	570.90	570.10	570.70	571.95	572.00	571.10	571.45	571.00	571.15	570.90	571.00	571.10
6	571.00	570.45	570.40	571.30	571.50	571.00	571.20	571.20	571.20	570.85	571.10	571.00
7	571.20	570.50	573.30	571.40	571.29	571.00	571.10	571.10	571.30	570.90	570.80	570.50
8	571.20	570.40	573.80	571.60	571.75	570.90	570.98	571.20	571.10	570.92	570.80	570.90
9	571.30	570.15	574.30	571.90	572.80	571.00	571.15	571.45	571.00	571.00	570.79	571.20
10	570.90	570.25	573.90	571.82	573.50	571.10	571.20	571.20	571.05	570.85	570.60	571.10
11	570.90	570.20	573.08	571.78	572.70	571.30	571.32	571.10	571.00	571.33	570.60	570.90
12	571.00	570.00	573.60	571.20	572.00	571.40	571.35	571.20	570.95	571.00	570.50	570.90
13	571.10	569.94	575.45	571.00	572.10	571.10	571.40	571.30	571.00	570.95	570.46	571.00
14	571.20	571.45	576.30	570.85	571.00	571.50	571.50	571.50	570.60	570.96	570.65	571.10
15	571.10	576.69	577.40	570.95	571.55	571.20	571.20	571.10	570.75	571.00	570.90	571.00
16	571.00	576.60	576.40	570.70	571.75	571.28	571.10	571.15	571.10	570.90	570.90	570.70
17	571.00	576.30	575.10	571.06	571.60	571.60	571.30	571.58	571.20	570.90	570.60	570.70
18	571.20	576.00	573.40	570.80	571.45	571.50	571.45	571.60	571.10	570.91	570.40	571.00
19	570.96	573.00	571.90	571.35	571.42	571.40	571.70	571.52	570.70	570.78	570.50	571.10
20	570.80	571.50	571.40	572.75	571.20	571.30	571.95	571.38	571.00	570.40	570.40	571.10
21	570.90	570.95	571.20	573.38	571.15	571.20	571.60	571.25	571.20	570.65	570.20	570.50
22	571.20	570.80	571.55	572.80	571.40	571.20	571.80	571.15	571.18	570.85	570.20	570.10
23	571.50	570.75	571.00	571.15	571.55	571.39	571.75	571.30	571.00	570.84	570.50	571.00
24	571.28	570.62	571.22	570.35	571.85	571.20	571.60	571.38	570.85	570.71	570.40	571.20
25	571.20	570.70	570.95	571.10	571.40	571.00	571.65	571.20	570.95	571.12	570.50	571.20
26	571.20	570.80	570.98	572.15	571.28	570.90	571.69	571.00	570.95	571.10	570.70	571.10
27	570.90	570.60	571.10	571.35	571.15	571.00	571.50	571.00	571.20	571.15	571.10	571.20
28	571.00	570.35	572.58	571.20	571.32	571.10	571.46	570.95	571.10	571.12	570.90	571.20
29	571.10	570.34	572.50	571.25	571.38	571.28	571.30	571.00	571.15	571.00	571.00	571.10
30	570.90	.....	571.61	571.00	571.30	571.00	571.28	571.15	570.85	571.20	570.70	571.03
31	570.70	.....	570.75	......	571.54	....	571.25	571.18	......	571.30	......	570.80

ERIE CANAL AT MAIN STREET BRIDGE, TONAWANDA, N. Y.

Between Pendleton and Niagara river Tonawanda creek is canalized to form the Erie canal. The State dam at Tonawanda controls the water stage in this level. A gage was established at Delaware–Main street bridge, Tonawanda, January 23, 1905, by

this Department. The gage is a vertical scale with painted 10th marks and is attached to the protection piling below the center pier of the bridge. The rigging of the gage, added to 560.00, gives the water-surface elevation. Readings are taken each afternoon by A. Weinholz.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Erie Canal at Tonawanda, N. Y. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	.....	571.20	.....	571.00	571.80	571.60	571.40	571.80	571.68	571.35	.....	570.95
2	571.80	.....	570.80	571.00	572.50	571.60	571.40	.....	571.68	571.35	571.65	571.00
3	571.80	571.00	570.50	571.00	.....	571.60	571.50	571.95	571.70	571.35	571.65	571.85
4	571.20	570.80	570.50	571.00	572.50	571.70	571.40	571.80	571.70	.....	571.65	571.70
5	.....	570.50	570.40	.....	571.50	571.50	.....	571.82	571.72	571.35	571.65	571.50
6	571.40	570.40	570.40	571.00	571.90	571.30	571.40	571.80	.....	571.35	571.65	.....
7	571.20	570.70	571.70	571.00	571.80	.....	571.40	571.70	571.72	571.40	571.65	571.60
8	571.40	570.60	.....	571.40	572.00	571.30	571.40	571.75	571.70	571.40	.....	571.50
9	570.80	.....	571.90	571.60	572.80	571.30	571.40	.....	571.60	571.45	571.55	571.50
10	570.90	570.70	571.80	571.50	.....	571.30	571.40	571.70	571.60	571.40	571.50	571.40
11	570.80	570.50	571.60	571.40	572.30	571.80	571.40	571.75	571.60	.....	571.45	571.50
12	.....	570.50	571.70	.....	571.80	571.80	.....	571.70	571.65	571.40	571.45	571.30
13	571.30	570.10	572.50	571.10	571.50	571.70	571.80	571.75	.....	571.40	571 45	.....
14	571.50	571.10	572.70	570.90	571.50	.....	571.80	571.70	571.60	571.40	571.45	571.35
15	571.50	573.00	.....	570.90	571.80	571.70	571.80	571.72	571.62	571.35	.....	571.05
16	571.00	.....	573.60	570.60	572.00	571.60	571.70	.....	571.65	571.35	571.40	570.80
17	571.50	572.90	572.90	571.00	.....	571.90	571.72	571.80	571.65	571.35	571.35	570.80
18	571.20	572.50	572.30	571.00	571.50	571.90	571.75	571.78	571.65	.....	571.30	571.00
19	.....	571.90	571.60	.....	571.50	571.80	571.70	571.80	571.60	571.35	571.30	571.00
20	570.90	571.20	571.10	571.50	571.40	571.70	571.78	571.78	.....	571.40	571.30	.....
21	570.80	571.20	571.20	572.00	571.60	.....	571.95	571.80	571.60	571.40	571.30	571.00
22	571.40	571.40	.....	571.50	571.60	571.60	571.85	571.78	571.60	571.40	571.10	570.80
23	571.50	.....	571.00	571.30	571.80	571.80	571.85	.....	571.45	571.40	571.10	570.00
24	571.30	570.80	571.00	570.30	.....	571.80	571.85	571.75	571.45	571.40	571.00	570.25
25	571.50	570.80	571.90	570.40	572.10	571.80	571.80	571.70	571.40	.....	571.00	570.40
26	.....	570.85	570.00	.....	571.50	571.60	.....	571.68	571.45	571.45	571.00	a
27	571.10	570.80	570.80	571.40	571.40	571.80	571.89	571.68	.....	571.55	571.05	a
28	570.80	570.70	571.50	571.30	571.50	.....	571.80	571.65	571.65	571.60	571.10	a
29	570.80	570.30	.....	571.50	571.70	571.60	571.80	571.67	571.50	571.65	.....	a
30	570.90	.....	571.40	571.50	571.60	571.40	571.79	.....	571.55	571.60	571.00	a
31	571.20	.....	570.80	.....	.....	.....	571.80	571.68	.....	571.60	.....	a

a No record on blank dates.

NIAGARA RIVER AT TONAWANDA, N. Y.

A gage was established January 23, 1905, by this Department, near the mouth of Tonawanda creek and below the State dam. The readings of this gage, added to 560.00, show the elevation of Niagara river at its junction with Tonawanda creek. The gage is a vertical scale graduated to feet and tenths from zero to 10 feet and is attached to the protection piling at the right-hand end of the draw span of the New York Central bridge in the lumber district at Tonawanda.

During 1908 the record at this station has been obtained by means of a recording gage and is in the form of weekly graphical records.

HUDSON RIVER DRAINAGE BASIN.

LOWER HUDSON RIVER DRAINAGE BASIN.

DESCRIPTION.

Below Troy the bed of Hudson river is depressed below tidewater level. The stage of the stream is controlled by tidal action, by the inflow of the main stream and by the lateral drainage jointly. The drainage tributary to this portion of the stream includes the south and east slopes of the Catskill mountain region on the west bank and a series of streams heading near the New York–Massachusetts and the New York–Connecticut lines on the east. These streams include the principal present and proposed sources of municipal water-supply of New York city.

KINDERHOOK CREEK AT ROSSMAN, N. Y.

A gaging station was established at Rossman highway bridge on Kinderhook creek, March 17, 1906, by Robert E. Horton. This gaging station is maintained by the U. S. Geological Survey in coöperation with this Department. The gage is of the weight-tape-and-reel pattern, and readings are taken morning, noon and evening by Wesley Ham.

The channel is rock, and is nearly straight for some distance above and below the gage.

The station is about one-quarter mile below a dam, and very little ice obstruction occurs except in extreme cold weather.

A description of Kinderhook creek, with the results of gagings made in 1892–1894, may be found in the report of the State Engineer and Surveyor for 1902, Supplement, pages 252–256.

Daily Gage Height, in Feet, of Kinderhook Creek at Rossman, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	28.48	27.18	27.63	28.13	28.72	27.75	26.88	......	26.42	26.30	26.52	26.53
2	28.42	27.20	27.52	28.12	28.35	27.47	26.75	26.67	26.45	26.47	26.56	26.53
3	28.32	27.08	27.40	28.03	28.05	27.08	26.77	26.73	26.55	26.38	26.58	26.48
4	28.25	26.97	27.22	27.93	27.93	27.22	26.70	26.75	26.50	26.42	26.43	26.57
5	27.95	26.92	27.12	27.87	27.88	27.02	26.72	26.73	26.48	26.32	26.48	26.43
6	27.83	26.93	27.07	27.77	27.82	26.97	26.62	26.85	26.18	26.32	26.60	26.55
7	27.78	27.00	27.18	27.67	27.82	27.02	26.77	26.72	26.37	26.55	26.43	26.53
8	27.67	27.07	27.32	27.83	28.77	26.92	26.68	26.75	26.33	26.43	26.50	26.55
9	27.57	27.07	27.33	28.35	28.82	26.83	26.72	26.60	26.35	26.50	26.55	26.79
10	27.45	26.96	27.23	28.28	27.90	26.92	26.68	26.72	26.42	26.42	26.48	26.68
11	27.48	26.92	27.42	28.15	28.72	26.83	26.67	26.62	26.50	26.21	26.50	26.70
12	27.55	26.90	27.93	28.05	28.33	26.88	26.67	26.68	26.33	26.41	26.52	26.60
13	29.30	26.95	30.28	27.92	28.07	26.83	26.65	26.68	26.38	26.43	26.50	26.52
14	28.87	27.10	29.70	27.82	28.13	26.82	26.63	26.68	26.40	26.45	26.48	26.58
15	28.37	31.55	28.87	28.30	28.27	26.92	26.67	26.70	26.47	26.50	26.60	26.59
16	28.25	31.83	28.87	28.13	28.08	28.03	26.65	26.57	26.43	26.37	26.53	26.62
17	28.07	28.33	28.17	28.07	28.00	28.02	26.58	26.52	26.40	26.43	26.24	26.58
18	27.92	27.75	27.97	27.98	27.85	27.88	26.53	26.53	26.35	26.33	26.53	26.65
19	27.87	27.52	27.90	28.28	27.68	27.70	26.88	26.70	26.33	26.38	26.52	26.48
20	27.72	27.32	27.90	28.25	27.62	27.32	26.62	26.82	26.12	26.43	26.50	26.47
21	27.62	27.13	27.92	28.25	27.60	26.93	26.87	26.73	26.40	26.40	26.52	26.53
22	27.50	27.18	28.13	28.12	27.40	26.80	26.80	26.68	26.40	26.46	26.54	26.60
23	27.45	27.13	29.27	27.97	27.38	26.85	......	26.68	26.31	26.48	26.45	26.60
24	27.33	27.08	29.00	27.83	27.20	26.83	......	26.65	26.32	26.42	26.52	26.58
25	27.28	27.17	28.70	27.63	27.07	26.92	......	26.63	26.28	26.22	26.57	26.30
26	27.47	27.22	28.68	27.67	27.07	27.60	......	26.67	26.27	26.48	26.58	26.62
27	27.47	28.25	28.70	27.82	26.95	27.32	27.60	26.63	26.20	26.42	26.53	26.52
28	27.48	28.03	28.73	27.93	26.95	26.98	27.52	26.68	26.33	26.50	26.53	26.43
29	27.32	27.77	28.68	27.97	26.95	26.98	27.30	26.57	26.52	26.63	26.58	26.53
30	27.18	......	28.72	27.97	27.23	26.93	27.25	26.48	26.28	26.62	26.45	26.50
31	27.08	......	28.67	......	27.38	......	26.95	26.48	......	26.50	......	26.53

NOTE.—Discharge probably affected somewhat by ice conditions from about Feb. 1 to 14 and Dec. 9 to 24.

Current-meter Discharge Measurements of Kinderhook Creek at Rossman, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
		Feet.	*Square feet.*	*Feet.*	*Second-feet.*
1908.					
Feb. 27*a*	D. M. Wood	150	343	28.28	1,050
May 5	D. M. Wood	147	287	27.90	746
Aug. 3*b*	Geo. M. Brett	139	169	26.78	141
Aug. 31	C. R. Adams	142	60	26.50	72.5
Sept. 8*c*	C. R. Adams	20	16.1	26.37	46.3
Sept. 20*d*	D. M. Wood	......	......	25.94	4.5
Dec. 31*e*	D. M. Wood	110	60.2	26.54	76.6

a Some floating ice. *b* Measurement made by wading 150 feet below the regular section. *c* Measurement made in tail-race by wading. *d* Discharge estimated. *e* Measurement made from the up-stream side of the bridge.

Rating Table for Kinderhook Creek at Rossman, N. Y., for 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
25 90	3	28 00	826	30 10	2,895	32 20	5,550
26.00	7	28 10	906	30 20	3,010	32 30	5,685
26 10	13	28 20	988	30 30	3,125	32 40	5,820
26 20	22	28 30	1,074	30.40	3,245	32 50	5,955
26 30	34	28.40	1,162	30 50	3,365	32 60	6,090
26 40	50	28 50	1,252	30.60	3,485	32 70	6,225
26 50	70	28.60	1,343	30.70	3,610	32 80	6,360
26 60	94	28.70	1,436	30 80	3,735	32 90	6,500
26 70	122	28 80	1,530	30 90	3,860	33 00	6,640
26 80	153	28.90	1,626	31.00	3,985	33 10	6,780
26 90	187	29 00	1,723	31.10	4,110	33 20	6,920
27 00	225	29 10	1,822	31.20	4,235	33 30	7,060
27 10	265	29 20	1,923	31 30	4,360	33 40	7,200
27 20	310	29.30	2,025	31 40	4,490	33 50	7,340
27 30	359	29 40	2,130	31 50	4,620	33 60	7,480
27 40	412	29 50	2,235	31 60	4,750	33 70	7,620
27 50	470	29 60	2,340	31 70	4,880	33 80	7,760
27 60	534	29.70	2,450	31 80	5,010	33 90	7,900
27 70	602	29 80	2,560	31 90	5,145	34 00	8,040
27 80	673	29 90	2,670	32 00	5,280	34 10	8,185
27 90	748	30 00	2,780	32 10	5,415		

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on 18 discharge measurements made during 1906, 1907 and 1908 and is well defined between gage heights 25.9 feet and 29 0 feet

NOTE.—This rating table is slightly modified from that used in preceding years. Above gage height 29 0 feet the discharge curve is assumed to be a straight line or tangent, by the U. S. Geological Survey It is understood, however, that a rating curve probably never really becomes a straight line, or tangent, and the U S. Geological Survey figures for gage heights over 29.0 feet are here tentatively published, subject to revision upon acquisition of additional data. This note applies also to records for preceding years.

Daily Discharge, Second feet, of Kinderhook Creek at Rossman, N. Y.

Sept.	Oct.	Nov.	Dec.
54	34	75	77
66	64	84	77
62	47	89	66
70	54	56	87
66	57	66	56
20	37	94	82
45	82	56	77
39	56	70	89
42	70	82	
54	54	66	
70	23	70	
39	52	75	
47	56	70	
50	60	66	
64	70	94	
56	45	77	
50	56	27	
42	39	77	
39	47	75	
15	56	70	
50	50	75	
50	62	80	
36	66	60	
37	54	75	
32	24	87	34
30	66	89	100
22	54	77	75
39	70	77	56
75	102	89	77
32	100	60	70
..	70	.	77

a Discharge estimated on the basis of Hoosic at Buskirk

Monthly Discharge of Kinderhook Creek at Rossman, N. Y.
[Drainage area, 331 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.		Accuracy.
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.	
1908.						
January	2,020	257	723	2.18	2.51	A
February	5,050	187	684	2.07	2.23	A
March	3,100	253	1,040	3.14	3.62	A
April	1,120	554	837	2.53	2.82	A
May	1,550	206	736	2.22	2.56	A
June	850	160	319	.964	1.08	A
July	....	77	212	.640	.74	A
August	....	66	115	.347	.40	A
September	82	15	47.1	.142	.16	A
October	102	23	56.7	.171	.20	A
November	94	27	73.6	.222	.25	A
December	100	....	61.1	.185	.21	A
The year	5,050	15	409	1.23	16.78	....

NOTE.—It is probable that the effect of ice conditions during February was not great. The values given above are on the basis of the open channel rating. The discharge December 9 to 24 was estimated to be 50 second-feet on the basis of precipitation and temperature records at Chatham.

Discharge July 23 to 26 estimated 475 second-feet and August 1 estimated 170 second-feet on the basis of Hoosic at Buskirk.

CATSKILL CREEK AT SOUTH CAIRO, N. Y.

The basin of this stream receives the run-off from the north slope of the Catskill range and lies, for the most part, in the timbered highlands of Greene county. The slopes are precipitous, there are no lakes, and the amount of artificial storage is small. The underlying rock formation is chiefly Devonian shale. The topography of the area is shown on the Durham, Coxsackie and Catskill sheets of the United States Geological Survey topographic atlas. The stream flows over a rock bed through much of its course and enters tide-water of Hudson river at Catskill.

The gaging station was established July 4, 1901, by Robert E. Horton and George B. Hollister, and is located at the highway bridge in the village of South Cairo. It is maintained by the U. S. Geological Survey in coöperation with this Department.

The stream channel is rock, covered in some places with earth. The bridge has a single span of 194.5 feet between abutments.

The stage of the stream is observed each morning and night from a standard chain gage, which is attached to the bridge and the elevation of which is referred to a circle near the outer corner on the up-stream side of the bridge-seat on the right-hand abut-

ment. The elevation of the bench-mark is 21.29 feet above gage datum.

This station has been maintained by the Board of Water Supply of New York city during 1907–8. The monthly run-off for 1907 is here published by courtesy of J. Waldo Smith, Chief Engineer.

Monthly Discharge of Catskill Creek at South Cairo, N. Y.
[Drainage area, 263 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.		Rainfall in inches.
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.	
1907.						
January	2,675	95	347	1.32	1.517	1.78
February	102	18	61	.23	.241	1.24
March	1,155	23	431	1.64	1.885	1.15
April	1,080	220	486	1.85	2.055	2.43
May	470	75	259	.99	1.131	3.16
June	470	10	128	.49	.538	2.93
July	75	20	34	.13	.152	3.08
August	21	1	6	.02	.024	.80
September	492	2	44	.17	.184	6.62
October	1,776	71	287	1.09	1.254	4.01
November	11,400	197	1,050	3.99	4.445	5.08
December	3,420	136	743	2.83	3.247	3.57
The year	11,400	1	323	1.23	16.673	35.85

ESOPUS CREEK AT KINGSTON, N. Y.

The Kingston gaging station was established July 5, 1901, by Robert E. Horton for the U. S. Geological Survey in coöperation with the New York Water Supply Departments, and was assumed by the Board of Water Supply of the city of New York on April 28, 1907. A continuous record of gage heights has been kept by John Douglass of Kingston, who reads the gage each night and morning.

The station is located on the up-stream side of the steel highway bridge on Washington avenue, Kingston, N. Y. There is a clear span of 115 feet between the abutments, which are nearly vertical. In addition to the main channel, there is an overflow channel 19 feet wide on the left bank, through which water flows at a gage height of about 12 feet.

The station was originally equipped by the U. S. G. S. with the standard chain gage, located on the up-stream side of the bridge near the right abutment. This gage was replaced on June 19,

1908, by a Board of Water Supply standard chain gage. The length of the chain is 31.04 feet from end of weight to marker.

Measurements are made from the bridge at high water and by wading or boat at lower stages. A sharp bend in the creek about 500 feet above the bridge causes considerable eddying and the current is uneven and irregular. At low water the velocities are more regular.

The bench-mark is located on the coping stone at the up-stream corner of the right abutment and has an elevation of 31.84 feet above the zero of the datum of the gage.

The discharge from January 17 to March 22, 1907, inclusive, was estimated by increasing the observed discharge at the Olive bridge weir in the ratio of the drainage areas at the two points. The drainage at point of gaging is 324 square miles.

Mean Daily Discharge, Second-feet, of Esopus Creek at Kingston, N. Y.

DAY.	.	Dec.
1907.		
1	80	490
2	10	520
3	90	440
4	80	430
5	75	510
6	75	390
7	80	430
8	90	380
9	80	390
10	80	390
11	80	3,850
12	40	5,850
13	40	3,140
14	00	2,030
15	80	1,900
16	80	2,920
17	90	2,140
18	40	960
19	10	710
20	80	1,390
21	90	1,390
22	30	1,330
23	40	870
24	80	1,330
25	90	3,110
26	60	2,680
27	80	2,010
28	70	1,590
29	60	1,680
30	40	1,910
31	..	2,100
Mean	40	1,[illegible]

Mean Daily Discharge, Second-feet, of Esopus Creek at Kingston, N. Y.

DAY.	July.	Aug.	Sept.	Oct.	Nov.	Dec
1908.						
1	115	114	40	123	465	c64
2	b140	106	36	123	400	c64
3	235	84	b36	74	325	c64
4	275	74	34	64	310	c38
5	750	b80	32	b58	260	c64
6	b370	84	34	64	220	c58
7	250	94	32	71	b240	c64
8	190	98	34	55	225	420
9	b160	86	36	53	180	295
10	160	62	36	48	200	260
11	b135	74	30	80	270	250
12	100	77	30	94	210	230
13	100	80	30	38	170	190
14	105	74	28	36	150	190
15	95	71	b28	34	160	230
16	b90	64	23	40	165	325
17	55	55	20	50	155	295
18	75	55	20	43	133	250
19	125	65	20	40	143	200
20	85	58	20	40	160	230
21	85	44	20	48	133	220
22	125	41	20	48	143	220
23	115	38	20	50	133	c106
24	b65	31	b20	b43	128	c133
25	350	41	20	48	150	c150
26	490	65	30	143	c64	245
27	355	52	23	1,130	114	220
28	b255	52	30	1,120	123	170
29	185	44	123	880	c66	165
30	180	38	170	760	c77	175
31	135	44	...	578	...	260
Mean	192	66	36	196	190	190

a Estimated. *b* Meter measurements. *c* Abnormal flows, due to storage at Pulp Mill dam, at Brown's station.

Monthly Discharge of Esopus Creek at Kingston, N. Y.

[Drainage area, 324 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET			Total in millions of gallons.	RUN-OFF.			Rainfall in inches.
	Maximum.	Minimum.	Mean.		Second-feet per square mile.	Depth in inches.	Per cent of rainfall.	
1907.								
January	3,850	390	1,119	22,417	3 45	3 987	159	2.50
February	500	170	274	4,950	.85	880	53	1.66
March	2,580	140	890	17,830	2 75	3,171	262	1.21
April	1,275	455	772	14,978	2 38	2 662	120	2.22
May	1,425	455	808	16,195	2 49	2,880	75	3.85
June	1,520	160	552	10,703	1 70	1 905	55	3.45
July	270	60	134	2,675	.41	.479	17	2.86
August	75	28	46	917	14	.163	14	1.12
September	2,400	25	654	12,673	2 02	2,252	21	10.48
October	6,400	285	1,220	24,445	3.77	4 350	64	6.77
November	10,250	540	2,049	39,724	6 32	7 066	97	7.24
December	5 850	380	1,590	31,857	4 91	5 667	96	5 89
The year	10,250	25	842	199,364	2 60	35 462	72	49.25
1908.								
January	1,650	250	874	17,513	2.70	3,116	92	3 38
February	10,660	175	1,086	20,354	3.35	3 625	58	6.20
March	5,600	195	1,452	29,101	4.48	5,176	178	2 90
April	2,350	670	1,106	21,433	3.42	3 802	134	2.84
May	6,575	570	1,850	37,075	5.71	6.596	73	9 06
June	825	120	336	6,511	1 04	1,161	52	2.23
July	750	55	192	3,845	0 59	0 684	11	6 05
August	114	31	66	1,337	0 20	0.238	12	2.05
September	170	20	36	694	0 11	0 125	6	2.24
October	1,130	34	196	3,929	0 61	0 699	17	4.06
November	465	68	190	3,686	0 59	0 656	113	0 58
December	420	38	190	3,804	0 59	0 676	26	2 60
The year	10 660	20	631	149,282	1 95	26 554	60	44.19

NIAGARA RIVER DRAINAGE.

GENERAL FEATURES.

Niagara river connects lakes Erie and Ontario. It receives the drainage from Tonawanda creek and adjacent smaller areas in New York.

ERIE CANAL AT CHANGE BRIDGE, PENDLETON, N. Y.

A gage was established January 30, 1905, by this Department at Change bridge crossing the Erie canal just east of the junction of the canal with Tonawanda creek at Pendleton. A vertical gage with painted division marks is attached to the piling of the left-hand side of the stream near the down-stream side of the bridge. The gage reads from 12 to 18 feet. The reading of the gage, added to 560.00, gives the elevation of water-surface. Readings are taken each afternoon by Jacob Snell, Jr.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Erie Canal at Pendleton, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	573.18	570.80	570.50	570.78	571.95	571.25	571.05	570.80	571.15	570.75	571.28	570.80
2	572.00	570.64	570.48	571.48	572 00	571.40	571.00	571.50	571.00	570.65	571.10	571.20
3	571 18	570.60	570.38	571.20	572.05	571.50	571.00	571.60	571.00	570.80	571.20	571.95
4	571.10	570.20	570 40	571 10	572 08	571.20	571.28	571.10	571.05	571.00	571.00	571.55
5	570.90	570.10	570.70	571.95	572.00	571.10	571.45	571.00	571.15	570.90	571.00	571.10
6	571.00	570.45	570.40	571.30	571.50	571.00	571.20	571.20	571.20	570.85	571.10	571.00
7	571.20	570.50	573.30	571.40	571.29	571.00	571.10	571.10	571.30	570.90	570.80	570.50
8	571.20	570.40	573.80	571.60	571.75	570.90	570.98	571.20	571.10	570.92	570.80	570.90
9	571.30	570.15	574.30	571.90	572.80	571.00	571.15	571.45	571.00	571.00	570.79	571.20
10	570 90	570.25	573.90	571.82	573.50	571.10	571.20	571.20	571.05	570.85	570.60	571.10
11	570.90	570.20	573 08	571.78	572.70	571.30	571.32	571.10	571.00	571.33	570.60	570.90
12	571.00	570 00	573.60	571.20	572 00	571.40	571.35	571.20	570.95	571.00	570.50	570.90
13	571.10	569.94	575.45	571.00	572.10	571.10	571.40	571.30	571.00	570.95	570.46	571.00
14	571.20	571.45	576.30	570.85	571.00	571.50	571.50	571.50	570.60	570.96	570.65	571.10
15	571.10	576 69	577.40	570.95	571.55	571.20	571.20	571.10	570.75	571.00	570.90	571.00
16	571.00	576.60	576.40	570.70	571.75	571.28	571.10	571.15	571.10	570.90	570.90	570.70
17	571.00	576.30	575.10	571.06	571.60	571.60	571 30	571.58	571.20	570.90	570.60	570.70
18	571.20	576.00	573.40	570.80	571.45	571.50	571.45	571.60	571.10	570.91	570.40	571.00
19	570.96	573.00	571.90	571.35	571.42	571.40	571.70	571.52	570.70	570.78	570.50	571.10
20	570.80	571.50	571.40	572 75	571.20	571.30	571.95	571.38	571.00	570.40	570.40	571.10
21	570.90	570.95	571.20	573.38	571.15	571.20	571.60	571.25	571.20	570.65	570.20	570.50
22	571.20	570.80	571.55	572.80	571.40	571.20	571.80	571.15	571.18	570.85	570.20	570.10
23	571.50	570.75	571.00	571.15	571.55	571.39	571.75	571.30	571.00	570.84	570.50	571.00
24	571.28	570.62	571.22	570.35	571.85	571.20	571.60	571.38	570.85	570.71	570.40	571.20
25	571.20	570.70	570.95	571.10	571.40	571.00	571.65	571.20	570.95	571.12	570.50	571.20
26	571.20	570.80	570.98	572.15	571.28	570.90	571.69	571.00	570.95	571.10	570.70	571.10
27	570.90	570.60	571.10	571.35	571.15	571.00	571.50	571.00	571.20	571.15	571.10	571.20
28	571.00	570.35	572.58	571.20	571.32	571.10	571.46	570.95	571.10	571.12	570.90	571.20
29	571.10	570.34	572.50	571.25	571.38	571.28	571.30	571 00	571.15	571.00	571.00	571.10
30	570.90	......	571.61	571.00	571.30	571.00	571.28	571.15	570.85	571.20	570.70	571.03
31	570.70	......	570.75	......	571.54	......	571.25	571.18	......	571.30	......	570.80

ERIE CANAL AT MAIN STREET BRIDGE, TONAWANDA, N. Y.

Between Pendleton and Niagara river Tonawanda creek is canalized to form the Erie canal. The State dam at Tonawanda controls the water stage in this level. A gage was established at Delaware–Main street bridge, Tonawanda, January 23, 1905, by

this Department. The gage is a vertical scale with painted 10th marks and is attached to the protection piling below the center pier of the bridge. The rigging of the gage, added to 560.00, gives the water-surface elevation. Readings are taken each afternoon by A. Weinholz.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Erie Canal at Tonawanda, N. Y. [a]

DAY.	e.
1908.	
1	95
2	00
3	85
4	70
5	50
6	
7	60
8	50
9	50
10	40
11	50
12	30
13	
14	35
15	05
16	90
17	60
18	00
19	00
20	
21	00
22	90
23	00
24	25
25	40
26	
27	
28	
29	
30	
31	

a No record on blank dates.

NIAGARA RIVER AT TONAWANDA, N. Y.

A gage was established January 23, 1905, by this Department, near the mouth of Tonawanda creek and below the State dam. The readings of this gage, added to 560.00, show the elevation of Niagara river at its junction with Tonawanda creek. The gage is a vertical scale graduated to feet and tenths from zero to 10 feet and is attached to the protection piling at the right-hand end of the draw span of the New York Central bridge in the lumber district at Tonawanda.

During 1908 the record at this station has been obtained by means of a recording gage and is in the form of weekly graphical records.

Mean Daily Discharge, Second feet, of Esopus Creek at Olive Bridge, N. Y.

DAY.	Jan.	Feb.	March.	April.	May. *a*	June. *a*	July. *a*	Aug. *a*	Sept.	Oct.	Nov.	Dec.
1907.												
1	2,214	332	113	896	575	375	169	44	21	872	1,172	318
2	1,296	337	116	752	530	680	144	44	20	665	1,786	309
3	988	370	133	650	492	874	122	36	118	555	6,280	290
4	1,120	274	137	577	902	785	105	36	322	875	2,612	271
5	1,020	301	110	536	872	898	105	36	765	776	1,753	206
6	876	294	110	463	769	988	116	36	277	638	2,860	261
7	819	218	105	401	738	830	122	36	169	547	8,588	240
8	944	201	110	429	790	725	105	33	126	927	3,688	229
9	984	178	105	405	739	620	94	29	115	840	2,257	240
10	848	189	106	402	683	560	78	29	248	708	1,661	4,594
11	764	180	113	415	607	493	84	29	944	635	1,273	3,731
12	760	160	115	492	572	448	139	29	1,275	628	1,020	2,037
13	704	158	114	512	525	375	127	26	625	533	850	1,353
14	605	178	594	510	479	358	100	26	428	467	726	1,102
15	592	192	847	488	437	312	89	23	325	412	616	981
16	485	172	637	435	728	286	72	23	277	376	545	809
17	346	166	746	433	897	264	105	23	231	348	482	697
18	435	151	798	386	740	242	116	33	190	313	444	612
19	511	163	714	363	718	242	84	33	190	290	424	550
20	1,283	169	685	355	650	301	72	27	164	296	379	486
21	848	160	567	334	567	242	84	21	170	321	396	464
22	597	170	670	320	520	228	72	25	170	286	435	380
23	434	188	1,569	333	512	194	72	27	370	264	358	1,748
24	377	166	1,789	775	420	188	62	35	687	241	336	3,017
25	459	174	1,381	930	392	169	62	35	412	228	441	1,791
26	610	165	1,107	900	448	150	62	32	328	212	398	1,332
27	512	135	1,000	830	467	162	53	31	290	217	358	1,064
28	498	126	1,178	722	467	150	48	32	286	4,971	332	1,272
29	407	.....	1,468	653	392	139	48	28	1,778	3,976	362	1,313
30	359	.....	1,313	606	375	188	44	23	1,358	2,289	336	1,419
31	289	.....	1,078	.....	410	.....	36	20	.....	1,539	.....	1,469
Mean	743	202	633	543	594	416	90	30	425	847	1,439	1,116

a May 23 to August 18, inclusive, discharge deduced from readings at Bishops Falls by comparison.

Mean Daily Discharge, Second-feet, of Esopus Creek at Olive Bridge, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1,160	186	222	1,520	4,625	590	73	100	35	78	460	105
2	1,010	206	228	1,295	2,465	486	74	90	29	62	390	105
3	868	218	286	1,076	1,858	474	151	80	26	67	338	74
4	745	231	242	885	1,432	430	255	70	26	62	312	87
5	654	231	144	762	1,167	396	290	70	26	62	264	118
6	518	231	182	784	986	370	219	70	26	57	242	74
7	646	231	215	745	1,396	361	158	67	26	44	228	233
8	1,039	225	215	1,112	2,910	346	140	73	26	44	222	389
9	609	218	175	2,034	1,965	331	114	72	26	40	212	263
10	455	212	169	1,534	1,528	314	97	62	26	40	198	202
11	369	206	175	1,312	1,227	283	101	62	26	48	185	178
12	1,072	199	286	1,136	1,066	238	90	69	26	53	178	264
13	1,367	199	592	997	950	195	76	64	26	53	166	206
14	1,032	199	1,269	857	807	170	70	52	26	40	170	204
15	836	7,882	1,590	829	759	196	68	52	26	36	183	220
16	743	4,710	1,865	892	702	254	64	52	18	40	164	260
17	600	2,066	1,149	810	662	216	59	52	18	36	161	225
18	610	1,165	930	753	595	209	60	57	20	36	153	280
19	542	921	1,343	763	542	202	60	46	20	36	150	307
20	437	830	1,040	737	498	168	59	40	20	36	146	216
21	483	525	841	690	398	148	55	40	20	29	134	189
22	512	375	823	612	5,733	124	68	48	19	32	118	180
23	475	308	887	565	4,038	115	58	48	20	32	118	177
24	400	228	1,480	625	2,430	123	57	36	20	36	120	179
25	264	127	1,392	678	1,724	124	590	29	20	59	116	286
26	382	228	1,333	780	1,291	104	400	42	23	358	119	250
27	70[illegible]	382	2,508	725	1,126	73	211	53	23	1,061	119	216
28	33[illegible]	340	4,068	1,330	924	75	152	44	28	661	122	209
29	375	222	4,651	1,007	773	78	125	40	282	958	122	179
30	348	.....	3,019	978	784	77	114	33	135	706	116	159
31	33[illegible]	.....	2,048	.....	1,216	.....	107	33	.....	567	.....	245
Mean	642	803	1,140	961	1,567	242	133	56	36	176	191	203

Monthly Discharge of Esopus Creek at Olive Bridge, N. Y.
[Drainage area, 239 square miles.]

MONTH.	Discharge in second-feet.			Total in millions of gallons.	Run-off.			Rainfall in inches.
	Maximum.	Minimum.	Mean.		Second-feet per square mile.	Depth in inches.	Per cent of rainfall.	
1907.								
January	2,214	289	743	14,890	3.11	3.586	143	2.50
February	337	126	202	3,658	.85	.883	53	1.66
March	1,789	105	633	12,680	2.65	3.052	252	1.21
April	930	320	543	10,531	2.27	2.537	114	2.22
May	902	375	594	11,890	2.48	2.864	74	3.85
June	988	139	416	8,049	1.74	1.939	56	3.45
July	169	36	90	1,805	.38	.433	15	2.86
August	44	20	30	607	.13	.146	13	1.12
September	1,778	20	423	8,190	1.77	1.974	19	10.48
October	4,971	212	847	16,954	3.54	4.084	60	6.77
November	8,588	332	1,439	27,885	6.02	6.717	93	7.24
December	4,594	206	1,116	22,354	4.67	5.385	91	5.89
The year	8,588	20	590	139,493	2.47	33.600	68	49.25
1908.								
January	1,367	264	642	12,874	2.68	3.101	89	3.49
February	7,882	127	803	15,057	3.36	3.625	57	6.40
March	4,651	144	1,140	22,858	4.77	5.501	188	2.93
April	2,034	565	961	18,629	4.02	4.486	151	2.98
May	5,733	398	1,567	31,425	6.56	7.560	82	9.23
June	590	73	242	4,699	1.01	1.138	50	2.29
July	590	55	136	2,724	0.57	0.657	10	6.32
August	100	29	56	1,129	0.23	0.271	13	2.04
September	282	18	36	702	0.15	0.169	7	2.46
October	1,061	32	176	3,534	0.74	0.852	20	4.21
November	460	116	191	3,700	0.80	0.892	156	0.57
December	389	74	203	4,058	0.85	0.977	38	2.58
The year	7,882	18	528	121,389	2.21	29.229	64	45.50

RONDOUT CREEK AT ROSENDALE, N. Y.

The Rosendale gaging station is located on the highway bridge and was established by Robert E. Horton for the U. S. Geological Survey in coöperation with the New York City Water Supply Departments on July 6, 1901; it was assumed by the Board of Water Supply of the city of New York on June 1, 1907, at which time a new standard Board of Water Supply chain gage was put in to replace the old one.

Measurements are taken from the bridge at high and medium stages and by wading at a point about 1,000 feet below the bridge at low stages.

The gage is located on the down-stream side of the bridge in the middle panel. The length of the chain from end of weight to marker is 34.53 feet.

The bench-mark is a circular cut on rock on up-stream corner, right abutment. The elevation is 33.56 above the datum.

The water is confined to one channel under the single span steel bridge, which is 135.7 feet between abutments, at all stages.

A portion of the water of the creek is diverted by a dam below High Falls and sent through the Delaware and Hudson canal, and is discharged into the creek below the gaging station. At Rock Locks, which is about one and one-half miles below Rosendale, there is an overflow weir, from which the approximate discharge of the canal may be obtained. The weir, which has a crest of 3.8 feet, is located at the left end of the lock and is equipped with a standard Board of Water Supply staff gage.

The gaging record as published includes the flow in the Delaware and Hudson canal. The canal opened April 15, 1907, closed November 10, 1907; opened April 12, 1908, closed December 12, 1908.

Mean Daily Discharge, Second feet, of Rondout Creek at Rosendale, N. Y.[a]

[a] Including Delaware and Hudson canal.

Mean Daily Discharge, Second-feet, of Rondout Creek at Rosendale, N. Y.a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1,360	620	630	2,250	5,385	1,150	b110	114	47	121	366	68
2	b970	620	620	2,070	b2,615	760	125	88	35	109	298	69
3	950	620	660	2,170	2,550	610	150	73	34	94	225	67
4	875	700	580	1,950	2,100	530	375	93	40	91	b192	85
5	920	790	650	1,470	1,090	b445	285	80	38	88	183	75
6	840	690	660	1,275	920	460	205	93	41	b80	168	70
7	1,240	875	580	1,275	b1,065	430	165	107	36	75	159	96
8	1,725	780	615	1,675	b5,670	370	b120	91	38	68	151	370
9	1,210	710	615	b3,460	2,610	360	110	83	b38	61	157	343
10	950	710	620	2,130	1,790	335	100	72	33	61	146	280
11	910	b730	b500	b1,740	1,425	310	105	b105	32	78	133	253
12	2,130	730	320	1,425	1,110	280	93	86	29	65	117	283
13	4,070	790	1,550	1,110	955	250	89	85	29	60	96	274
14	2,740	875	3,640	1,000	900	225	84	83	30	39	153	265
15	b1,850	c8,000	3,275	1,110	815	265	91	78	30	44	134	244
16	1,410	7,075	b3,450	1,165	735	660	84	71	b27	46	116	214
17	1,160	b2,800	b2,375	880	670	410	79	77	25	43	98	192
18	925	1,690	1,800	895	545	335	84	97	25	45	104	196
19	800	1,210	3,410	880	505	265	84	78	28	45	128	190
20	790	b1,575	3,050	805	470	230	91	72	27	44	118	198
21	720	1,160	1,900	825	b690	205	89	70	b25	39	102	192
22	720	860	1,800	725	4,660	180	84	71	21	37	96	188
23	820	790	1,960	635	4,390	180	93	62	27	35	92	198
24	750	b710	2,925	585	2,670	180	b89	56	35	33	83	274
25	670	580	3,580	580	1,535	200	175	55	44	36	136	238
26	640	770	b2,600	875	1,240	180	430	71	39	45	128	196
27	760	b1,660	2,980	785	1,150	160	210	95	40	338	109	184
28	b790	1,160	4,040	1,190	b900	135	b135	72	99	535	102	170
29	630	800	3,920	1,000	750	110	115	86	182	814	96	170
30	620	......	3,760	920	800	130	112	62	143	657	85	152
31	690	......	2,710	......	1,910	......	110	55	......	459	......	214
Mean	1,150	1,417	1,993	1,295	1,762	345	138	80	44	141	142	194

a Including Delaware and Hudson canal. *b* Meter measurement. *c* Estimated.
NOTE.—Feb. 2 to Feb. 15, creek covered with ice.

Monthly Discharge of Rondout Creek at Rosendale, N. Y., Including Delaware & Hudson Canal.
[Drainage area, 380 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			Total in millions of gallons.	RUN-OFF.			Rainfall in inches.
	Maximum.	Minimum.	Mean.		Second-feet per square mile.	Depth in inches.	Per cent of rainfall.	
1907.								
January	5,300	690	1,512	30,309	3.98	4.59	132	3.49
February	1,270	470	854	15,460	2.25	2.34	121	1.93
March	7,240	380	2,140	42,867	5.64	6.49	346	1.88
April	2,000	468	789	15,313	2.08	2.32	112	2.07
May	2,558	428	748	14,985	1.97	2.27	62	3.69
June	1,507	168	508	9,849	1.34	1.49	41	3.66
July	388	62	157	3,139	.41	.47	16	3.03
August	141	20	65	1,297	.17	.20	10	1.95
September	2,076	20	564	10,935	1.48	1.66	17	9.74
October	6,509	262	970	19,436	2.55	2.94	55	5.37
November	12,609	650	1,920	37,239	5.06	5.64	88	6.44
December	4,250	430	1,311	26,289	3.45	3.98	81	4.89
The year	12,609	20	962	227,118	2.53	34.37	71	48.14
1908.								
January	4,070	620	1,150	23,033	3.03	3.485	114	3.07
February	8,000	580	1,417	26,555	3.73	4.014	70	5.77
March	4,040	320	1,993	39,926	5.24	6.044	177	3.41
April	3,460	580	1,295	25,111	3.41	3.802	109	3.49
May	5,670	470	1,762	35,300	4.64	5.336	70	7.61
June	1,150	110	345	6,681	0.91	1.013	55	1.85
July	430	79	138	2,760	0.36	0.418	9	4.76
August	114	55	80	1,604	0.21	0.243	9	2.62
September	182	21	44	850	0.12	0.129	6	2.35
October	814	33	141	2,835	0.37	0.426	12	3.65
November	366	83	142	2,760	0.37	0.418	60	0.70
December	370	67	194	3,883	0.51	0.589	20	2.98
The year	8,000	21	725	171,298	1.91	25.917	61	42.26

MOHAWK RIVER DRAINAGE BASIN.

DESCRIPTION.

Mohawk river, the largest of the tributaries of the Hudson river, rises in the sandy hills south of Boonville, in western New York, about 40 miles from the east end of Lake Ontario. Its uppermost tributaries are fed by large springs, and in addition the stream receives considerable water brought in from the adjacent Black river drainage basin for the supply of the Black River and Erie canals.

The Mohawk flows southward until it reaches the city of Rome, at which point it turns to the east, flowing across the state in a course a little south of east until it enters the Hudson at Cohoes, a few miles above Troy. It has a length by actual course of 140 to 145 miles, and a drainage area, measured at the mouth, of about 3,468 square miles.

The immediate valley of the Mohawk is broad and open, at many places a mile or two in width, from which there is a rise, usually gradual but sometimes abrupt, to hills which attain altitudes several hundred feet above the stream. Toward the mouth of the river the valley becomes more contracted and the meadows disappear. The flats which border the stream have a rich alluvial soil; the more elevated lands are covered with gravelly loam and clay.

Above Rome the Mohawk flows through a deep gorge in shale rock; from Rome eastward to Little Falls the valley is deeply filled with alluvial deposits, and the flood plains on either side become submerged during freshets, thus acting to some extent as storage reservoirs. At Little Falls the river cuts through a rocky gorge, whose walls rise precipitously 500 or 600 feet.

Below Rome the fall of the river is small and rather uniform, being made up of long quiet reaches with slight riffles; but at Little Falls this uniformity is broken, and the stream descends in a succession of falls about 45 feet in 2,500. The average fall between Rome and the lower aqueduct at Crescent, a distance of 110.7 miles, is 2.43 feet per mile; thence to the level of slack water above Troy dam there is a farther descent of 149.5 feet in 4.4 miles, but of this 105 feet is included within the improved power at Cohoes.

The principal tributaries of the Mohawk below the source are, successively, Oriskany, West Canada, East Canada and Schoharie creeks.

The Erie canal runs parallel to the Mohawk through most of its course below Rome and derives a part of its water-supply from the river. Feeder dams for purposes of diversion are located on the river at Delta, Rome, Little Falls, Rocky Rift and Rexford Flats. A dam at Oriskany creek also diverts into the canal a portion of the flow of that tributary, as well as waters brought into the Mohawk basin from storage reservoirs located in the upper drainage basin of Chenango river near Hamilton, N. Y. There is also a diversion dam near the mouth of Schoharie creek, the largest tributary of the Mohawk.

MOHAWK RIVER AT COHOES, N. Y.

This gaging station, which is located at the Cohoes Water Company's dam, was established April 1, 1904, by E. A. Lamb of this Department in conjunction with the United States Weather Bureau. The gage board is secured to inside of breakwater at north end of forebay about 200 feet above the dam, with its zero mark at elevation 153.47. The gage is graduated in feet and tenths and is read twice daily by William Butler.

The present dam is of masonry, and is built immediately downstream from old wooden dam, which now acts as a timber approach, having a slope of 1 on 2½. The top of masonry dam slopes away from crest at the rate of 1 on 5, the total width being ten feet. The average elevation of crest is 154.2 and its length is 1,279 feet; there is an additional spillway in gate-house of 24 feet, making total length of spill, 1,303 feet.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Cohoes, N. Y. a

DAY.	Jan.	Feb.	March.	April.	May.	J	r.	Dec.
1908.								
1	156 07	154 57	154 87	156 52	156 62	1	92	154 67
2	155 82	154 67	154 62	156 32	157 02	1	52	154 72
3	155 52	154 52	154 57	156 17	156 72	1	37	154 72
4	155 37	154 42	154 92	155 82	156 27	1	22	154 42
5	155 97	154 37	155 17	155 77	155 92	1.	12	154 52
6	155 27	154 27	155 17	155 62	155 67	1.	12	154 77
7	155 17	154 27	155 22	156 07	155 67	1.	27	154 47
8	155 07	154 27	155 27	156 22	156 97	1.	57	154 37
9	155 02	154 57	155 12	157 37	157 07	1.	22	154 67
10	153 97	154 32	155 07	156 97	156 62	1.	17	154 82
11	154 92	154 27	155 02	156 67	156 27	1.	07	154 77
12	154 97	154 27	155 27	156 67	155 92	1.	47	154 67
13	155 02	154 22	155 77	156 37	155 52	1.	82	154 77
14	155 27	154 27	157 42	156 12	155 57	1.	77	154 67
15	155 22	154 87	157 57	155 82	156 12	1.	92	154 77
16	155 22	156 82	157 82	156 27	155 97	1.	57	154 92
17	155 27	157 57	156 82	156 22	155 82	1.	42	154 82
18	155 27	157 12	156 42	155 87	155 47	1.	32	154 77
19	155 27	156 67	156 17	155 87	155 37	1.	32	154 82
20	155 07	156 17	156 17	155 97	155 27	1.	27	154 77
21	154 97	155 92	155 92	156 02	155 22	1.	42	154 62
22	154 97	155 72	155 77	155 92	155 17	1.	77	154 57
23	154 92	155 87	155 92	155 72	155 17	1.	52	154 42
24	154 97	155 32	156 32	155 57	155 47	1.	42	154 42
25	154 97	155 27	157 07	155 57	155 42	1.	42	154 67
26	155 07	155 22	156 57	155 92	155 32	1.	47	154 57
27	155 02	155 27	157 02	156 22	155 47	1.	82	154 67
28	154 92	156 82	157 37	156 22	155 42	1.	07	154 52
29	154 67	156 52	157 87	156 27	155 27	1	17	154 42
30	154 72	....	157 82	156 22	155 27	1	82	154 32
31	154 97	...	157 02	.....	155.37		.	154 32

a Above Cohoes dam.

Current-meter Discharge Measurements of Cohoes Co.'s Canal at Cohoes, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Sept 16	A. R. Patchke	3 74	456	1.97	897
Sept 21	E. F. Weeks	3 38	498	2 44	1,216
Sept 24	Weeks and Patchke	3 58	449	1.90	852
Sept 28	Weeks and Patchke	3 70	454	2.40	1,090

MOHAWK RIVER NEAR DUNSBACH FERRY, N. Y.

This gaging record is kept at the dam of the West Troy Water Company, one-fifth mile above Dunsbach Ferry bridge, 9 miles from the mouth of the river. The dam is in two sections, situated on opposite sides of a Hudson river shale island. The left wing at the upper end of the island has a crest length of 380 feet. The right wing, 500 feet down-stream at the foot of the island, has a crest 280 feet long.

The record was established, March 12, 1898, for the primary purpose of checking a system of levels for the United States Board

of Engineers on Deep Waterways, by D. J. Howell, C. E., who has furnished the earlier portion of the record. No record was kept from April 1, 1899, to August 1, 1900. During the period 1900–1907, the record was maintained under the direction of the U. S. Geological Survey in coöperation with this Department. During 1908 the record was maintained by this Department.

In the pumping station adjoining the dam there are two turbines of the old American type, one 66 inches and the other 75 inches in diameter. A new 54-inch Victor turbine was installed during 1902. The discharge is calculated from the recorded daily run of the water-wheels and working head. The turbines drive pumps, taking water from the river for water-supply purposes, the capacity of the pumps being 3,500,000 gallons per day, equivalent to a continuous flow of 5.4 second-feet.

The dam is of masonry, with a flat granite crest 5.5 feet wide. It was rebuilt in 1903, and a new profile obtained. The crest gage is attached to the timber cribbing 50 feet above the lower section of the dam, with its zero mark at elevation 172.00, referred to the United States Deep Waterways datum. Gage readings are taken twice daily at intervals of about 12 hours, by Robert Wilson. The mean of the two daily readings is used in computing the flow. The discharge over the main dam has been calculated by means of the weir formula, using coëfficients derived from the United States Geological Survey experiments.

During high water the current of the stream through the cross-section of the channel leading to the lower dam has a velocity of several feet per second. The head due to this velocity has been added to the observed head as a correction for velocity of approach to the lower dam. The upper dam is situated 450 feet up-stream from the crest gage.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Dunsbach Ferry, N. Y. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	Jy	Nov.	Dec.
1906.									
1	177 08	174 93	175 18	177 68	177 58	175 63	17	5 68	175 23
2	176 78	174 93	175 13	177 38	178 18	175 33	17	5 53	175 13
3	176 43	174 83	175 43	176 78	177 98	175 23	17	5 33	175 08
4	176 13	174 83	175 93	176 23	177 63	175.13	17	5 08	175 03
5	175 78	174 83	175 78	176 63	177 28	175 03	17	4.98	175 03
6	175 45	174 83	175 68	176 93	176 78	174 88	17	4.93	174 93
7	175 13	174 78	175 63	177 28	176 33	174 83	17	4.88	174 78
8	175 13	174 73	175 53	178 28	176 03	174.83	17	4.83	174 83
9	175 13	174 73	175 43	179 18	176 13	174.73	17	4 73	174 83
10	175 13	174 83	175 43	179 28	177 48	174.73	17	4.73	174 98
11	175 08	174 83	175 33	178 88	176 98	174 83	17	4 68	175 23
12	175 22	174 83	175 43	178 48	176.58	174 83	17	4 73	175 58
13	175 43	174 98	176 73	177 43	176 33	174 88	17	4 73	175 58
14	175 78	175 53	180 08	176 93	176 43	174 88	17	4.73	175 48
15	175 83	176 08	179 23	176 73	177 08	174 83	17	4 78	175 38
16	175 88	182 13	179 33	176 63	176 58	174 73	17	4 78	175 28
17	175 43	179 98	178 68	176 58	176 18	174 73	17	4 73	175.13
18	175 38	178 28	177 83	176 53	175 83	174 63	17	4 73	174 98
19	175 28	177 03	177 13	176 78	175 68	174 58	17	4 83	174 88
20	175 18	176 73	176 78	177 18	175 63	174 53	17	4 83	174 88
21	175 18	176 73	176 43	176 98	175 58	174 48	17	4 83	174 93
22	175 03	176 68	176 33	176 53	175 53	174 63	17	4.93	174 83
23	175 13	176 53	176 53	176 23	175 93	174 68	17	4.93	174 78
24	175 13	176 13	177 13	176 18	176 48	174 63	17	4.93	174 68
25	175 13	175 93	178 33	176 53	175 93	174 63	17	4 98	174 63
26	175 13	175 68	177 98	176 88	175 48	174.63	17	5 08	174 63
27	175 13	175 38	178 23	177 08	175 53	174 53	17	5 43	174 63
28	175 03	175 33	178 63	177 08	175 83	174 43	17	5 58	174 58
29	175 03	175 23	178 38	177 08	175 93	174 33	17	5 43	174 58
30	174 98		178 28	177 08	175 78	174 43	17	5 33	174 63
31	174 93	.	178 13		175 68	. .	17	..	174 68

a Above dam.

Mean Daily Discharge, Second feet, of Mohawk River at Dunsbach Ferry, N. Y.

DAY.	Jan.	Feb.	March.	April.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	13,421	2,761	3,591	17,378	16,741	5,491	1,181	1,641	731	621	5,701	3,712
2	11,551	2,761	3,431	15,371	21,091	4,191	1,181	1,521	676	1,411	5,061	3,347
3	9,519	2,372	4,621	11,551	19,611	3,761	1,181	1,066	621	1,671	4,191	3,177
4	9 892	2,254	6 931	8,441	17,061	3,431	1,181	951	621	1,761	3,261	3,017
5	6 067	2,328	6,171	10,681	14,691	2,924	951	951	621	1,521	2,931	3 017
6	4,757	2,431	5,701	12,481	11,551	2,424	951	1,181	621	1,301	2,761	2,677
7	3,347	2 250	5,491	14,649	9,001	2,254	951	1,411	621	1,212	2,601	2,187
8	3,385	2,101	5,061	21,777	19,981	2,254	841	1,521	621	1,966	2,431	2,347
9	3,431	2,101	4,469	29,057	20,637	1,924	951	1,301	621	2,101	2,101	2,347
10	3,431	2,387	4 444	29,937	15,977	1,924	1,066	1,181	621	1,761	2,101	2,847
11	3,261	2,347	4,014	26,612	12,717	2,254	1,181	951	621	1,521	1,981	3,677
12	3,761	2,342	4,444	23,441	10,317	2,254	1,411	951	621	1,362	2,101	5,222
13	4,621	2,931	11,015	25,711	8,917	2,424	1,761	896	566	1,250	2,101	5,271
14	6,171	5,061	37 283	12,481	9,477	2,483	1,641	786	511	1,250	2,101	4,841
15	6,421	7,643	29,384	11,136	13,337	2,431	1,761	731	511	1,181	2,271	4,411
16	5,701	59,158	30,304	10,504	10,317	2,101	1,981	621	511	951	2,271	3,981
17	4,621	36,492	24,869	10,224	8,107	2,101	2,931	731	511	951	2,101	3,431
18	4,411	21,777	18,240	9,974	6,337	1,871	2,931	3,261	511	841	2,101	2,931
19	3 981	13,062	13 600	11,551	5,617	1,761	2,931	5,491	511	807	2,431	2,601
20	3,562	11,230	11,551	14,041	5,407	1,438	2,101	2,601	511	807	2,431	2,601
21	3 517	11 192	9 561	12,801	5,187	1,403	1,871	2,271	511	664	2,431	2,761
22	2,924	10,961	9 001	10,121	4,977	1,738	1,871	1,981	401	664	2,761	2,431
23	3,350	10 121	10,121	8,441	6,931	1 804	1,641	1,871	401	774	2,761	2,271
24	3,431	7 941	13 731	8 191	9,841	1,694	1,981	1,521	401	708	2,761	1 981
25	3,431	6 931	22,251	10,121	6,931	1,694	2,761	1,561	401	1,066	2,931	1,871
26	3,431	5 701	19,611	12,171	4 841	1,768	2,431	1,411	401	1,301	3,261	1,871
27	3,431	4,411	21 461	13,421	5 061	1,641	2,431	1,066	401	1,871	4,621	1 671
28	3,101	4,191	24 621	13 421	6 421	1,411	2,101	951	401	3,761	5,271	1,761
29	3,101	3,761	22,613	13,421	6 931	1,181	1 981	896	401	5,617	4,621	1,761
30	2 931		21,777	13,421	6,171	1,411	1 981	841	401	8,161	4,191	1,871
31	2,761	.	20,672		5,701	. .	1,871	731	. . .	7,638	. . .	1,981
Mean	4,863	8,655	13,872	14,751	10,513	2,248	1,741	1,447	529	1,894	3,021	2,908

Monthly Discharge of Mohawk River at Dunsbach Ferry, N. Y.
[Drainage area, 3,440 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	13,421	2,761	4,863	1.41	1.62
February	59,158	2,101	8,655	2.51	2.71
March	37,283	3,431	13,872	4.02	4.62
April	29,937	8,191	14,751	4.28	4.79
May	21,091	4,841	10,513	3.05	3.51
June	5,491	1,181	2,248	0.652	0.730
July	2,931	841	1,741	0.505	0.581
August	5,491	621	1,447	0.420	0.483
September	731	401	529	0.153	0.171
October	8,181	621	1,894	0.549	0.631
November	5,701	1,981	3,021	0.876	0.981
December	5,271	1,761	2,906	0.845	0.972

MOHAWK RIVER AT REXFORD FLATS, N. Y.

A gage was established August 24, 1905, by this Department, above the State feeder dam at Rexford Flats. A box-and-chain gage is located on the right-hand, or south abutment of the dam, a few feet up-stream from the crest line. The elevation of water-surface, when the gage reads zero, is 208.16; standard chain length 10.75. Readings are taken each morning and afternoon by J. Reepmeyer, Jr., and a record was formerly maintained at this dam to determine the discharge. The results may be found in the report of the State Engineer and Surveyor for 1902, supplement, pages 186–192. During the navigation season part of the flow of the Mohawk river is diverted to Erie canal through the Rexford Flats feeder.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Rexford Flats, N.Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	211.31	209.46	209.76	211.56	212.86	210.06	208.16	208.16	*a*	209.61	209.81	209.96
2	210.86	209.46	209.81	211.21	212.81	210.06	208.16	208.16	*a*	209.76	209.76	209.86
3	210.66	209.56	209.86	211.06	212.61	209.96	208.16	208.16	*a*	209.81	209.76	209.81
4	210.31	209.56	209.96	210.91	212.26	209.86	208.16	208.16	*a*	209.91	209.66	209.76
5	210.11	209.56	209.96	210.81	211.76	209.76	208.16	208.66	*a*	209.61	209.66	209.76
6	209.96	209.56	209.86	210.66	211.31	209.66	208.16	209.36	209.36	209.51	209.66	209.76
7	209.96	209.56	209.86	210.56	210.86	209.56	208.16	209.86	209.36	209.36	209.56	209.81
8	209.96	209.56	209.86	210.51	212.96	209.48	208.16	209.91	209.26	209.28	209.56	210.01
9	209.86	209.56	209.76	210.86	212.56	209.46	208.16	209.71	209.16	209.26	209.56	210.01
10	209.86	209.56	209.76	210.91	211.91	209.56	208.16	209.66	209.16	209.41	209.56	209.96
11	209.86	209.56	209.81	211.01	211.46	209.46	208.16	209.66	209.16	209.16	209.50	209.86
12	209.86	209.56	210.01	211.06	211.06	209.46	208.16	209.71	209.16	209.26	209.71	209.86
13	209.86	209.56	210.96	211.01	210.66	209.36	208.16	209.66	209.06	209.26	209.76	209.76
14	209.86	209.61	212.56	210.96	210.71	209.36	208.16	209.56	209.06	209.26	209.66	209.76
15	209.76	209.81	214.81	210.96	210.91	209.36	208.16	209.56	209.06	209.66	209.56	209.86
16	209.76	215.01	213.81	210.81	210.81	209.36	208.16	209.56	208.96	209.66	209.56	209.88
17	209.66	213.36	212.96	210.61	210.76	209.36	208.16	209.51	208.96	209.16	209.66	209.76
18	209.66	212.66	212.46	210.56	210.66	209.26	209.16	210.06	208.96	209.16	209.66	209.76
19	209.61	212.06	212.21	210.46	211.01	209.26	210.01	210.41	208.96	209.16	209.66	209.76
20	209.56	211.06	212.01	210.46	211.01	209.26	210.78	209.76	*a*	209.16	209.66	209.76
21	209.56	210.46	211.66	210.46	210.91	209.16	210.44	209.71	*a*	208.66	209.56	209.76
22	209.46	210.21	211.66	210.36	210.76	209.16	209.96	209.86	*a*	208.66	209.56	209.76
23	209.46	210.11	212.01	210.41	210.66	209.16	209.61	*a*	*a*	208.66	209.56	209.66
24	209.56	210.01	211.96	210.56	210.56	208.66	209.46	*a*	*a*	208.66	209.71	209.58
25	209.56	209.86	211.66	210.46	210.51	208.66	209.36	*a*	*a*	208.66	209.91	209.56
26	209.66	209.66	211.26	210.36	210.46	208.66	209.26	*a*	*a*	208.66	210.14	209.56
27	209.66	209.81	211.86	210.31	210.36	208.66	209.21	*a*	208.96	209.51	210.24	209.56
28	209.66	209.86	212.56	210.21	210.26	208.66	209.16	*a*	208.96	209.66	210.34	209.56
29	209.56	209.81	214.11	210.21	210.21	209.16	209.16	*a*	209.36	210.01	210.21	209.56
30	209.56	......	212.61	210.31	210.11	209.16	209.16	*a*	209.51	210.11	210.01	209.56
31	209.56	......	211.96	......	210.01	......	209.16	*a*	.....	210.01	......	209.46

a No record.

Current-meter Discharge Measurements of Rexford Flats Feeder at Rexford Flats, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Sept. 22...	Weeks and Patchke..................	1.80	95.7	......	176
Sept. 25...	Weeks and Patchke..................	1.68	87.7	......	178

MOHAWK RIVER AT SCHENECTADY, N. Y.

A gage was established in the Mohawk river at Scotia bridge, Washington street, Schenectady, April 3, 1904, by this Department. The gage is attached to the down-stream end of first pier from right-hand side of the bridge. A gage zero is at elevation 208.76. Readings are taken by E. A. Vrooman. This gaging station is maintained in coöperation with the U. S. Weather Bureau, by this Department.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Schenectady, N. Y. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	212.66	210.26	211.26	214.01	215.26	211.36	209.06	209.76	209.16	209.76	209.76	210.06
2	211.96	210.26	211.26	213.26	215.01	211.56	208.96	209.66	209.16	209.76	209.76	210.26
3	211.41	210.26	211.26	212.56	214.01	210.96	208.96	209.56	209.16	209.66	209.76	210.26
4	210.91	210.26	211.26	211.51	213.36	210.21	208.96	209.56	209.26	209.66	209.61	210.26
5	210.46	210.26	211.26	211.31	212.06	209.76	209.96	209.46	209.26	209.56	209.36	210.26
6	210.06	210.26	211.26	211.56	215.16	209.76	209.96	209.36	209.26	209.46	209.36	210.26
7	209.86	210.26	211.26	211.86	215.26	209.76	209.96	209.86	209.26	209.46	209.41	210.11
8	209.76	210.26	211.26	211.96	213.91	209.76	209.96	210.06	209.26	209.46	209.46	209.86
9	209.76	210.26	211.26	216.16	212.76	209.76	209.96	210.11	209.36	209.36	209.41	210.26
10	209.76	210.26	211.26	214.76	212.81	209.76	209.96	209.96	209.36	209.36	209.56	210.36
11	209.76	210.26	211.26	214.51	212.56	209.76	209.96	209.91	209.36	209.46	209.51	210.16
12	209.76	210.26	211.76	213.86	212.16	209.76	209.96	209.86	209.36	209.46	209.66	210.01
13	209.76	210.26	215.41	213.66	211.76	209.76	209.86	209.76	209.26	209.46	209.91	209.86
14	210.16	210.86	217.01	213.31	211.76	209.76	209.86	209.76	209.26	209.56	210.16	209.86
15	210.26	213.16	216.56	213.26	213.01	209.76	209.76	209.76	209.26	209.56	210.26	210.06
16	210.26	218.01	217.26	213.66	213.16	210.41	209.71	209.81	209.26	209.56	210.26	210.06
17	210.26	216.76	217.66	213.26	211.46	209.96	209.66	209.71	209.26	209.56	210.26	210.26
18	210.06	215.51	216.66	212.26	211.46	209.76	209.66	211.11	209.26	209.46	210.16	210.26
19	210.26	213.36	215.06	211.76	211.46	209.66	210.21	210.91	209.26	209.36	209.96	210.26
20	210.26	212.41	213.36	212.11	211.46	209.56	210.51	210.26	209.26	209.36	209.96	210.26
21	210.26	212.26	211.46	211.86	211.46	209.56	210.06	209.96	209.26	209.36	210.06	210.26
22	210.26	212.26	211.56	211.76	211.46	209.56	210.46	209.86	209.26	209.36	210.16	209.86
23	210.26	212.26	212.66	211.96	211.46	209.56	210.36	209.91	209.26	209.36	210.06	209.86
24	210.26	211.86	214.16	211.16	211.46	209.56	210.11	209.61	209.26	209.26	210.16	209.86
25	210.26	211.41	214.96	210.86	211.11	209.56	210.11	209.41	209.26	209.26	210.06	209.86
26	210.26	211.26	215.31	210.76	210.86	209.56	210.16	209.36	209.26	209.31	210.46	209.86
27	210.26	211.26	215.46	210.76	210.56	209.56	210.01	209.36	209.26	209.51	210.71	209.86
28	210.26	211.26	215.66	212.51	210.76	209.36	210.06	209.36	209.26	209.46	210.61	209.86
29	210.26	211.26	217.66	215.01	210.56	209.26	210.01	209.26	209.36	210.11	210.36	209.86
30	210.26	......	217.91	214.66	210.56	209.11	209.76	209.26	209.46	210.36	210.16	209.86
31	210.26	......	215.96	......	210.56	......	209.76	209.26	......	210.06	......	209.86

a Scotia Bridge.

MOHAWK RIVER AT TRIBES HILL, N. Y.

This gaging station, which is located at the suspension bridge over the Mohawk river between Fort Hunter and Tribes Hill, was established April 3, 1904, by E. A. Lamb of this Department in coöperation with the U. S. Weather Bureau. The gage is a vertical board attached to the down-stream end of the north abutment of the suspension bridge. It is graduated in feet and tenths and the elevation of zero is 267.71.

The elevation of bench-mark, marked "U. S. Weather Bureau Tablet No. 13," set in second course of the northeast anchorage of this bridge, is 295.021. Observations of the stage of the stream were taken twice each day.

Current-meter measurements are taken from the down-stream side of the suspension bridge, which is 535.6 feet long between abutments. The channel of the river is straight for some distance each way from the bridge, and the cross-section directly under the bridge and below the bridge is quite uniform. About 300 feet above the bridge rapids are formed during low water, the river being shallow and having a rough and stony bed.

This gaging station is located about 1,000 feet below the junction of the Mohawk river and Schoharie creek, and the record here will show the combined discharge of these streams.

Beginning in 1907 the conditions at this station have been modified by construction work for the Barge canal, in progress near-by.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Tribes Hill, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	270 76	268.51	268.66	271 61	272.41	269.86	267.51	267.51	267.21	267.76	268.01	268.16
2	270.36	269.01	268 66	271.16	272.46	269.71	267.51	267.51	267.21	267.66	267.71	268.46
3	269.66	269.31	268.86	270.81	271.81	269.16	267.51	267.41	267.21	267.61	267.66	268.26
4	269.31	269.36	268.96	270.56	271.01	268.66	267.46	267.31	267.21	267.51	267.71	267.96
5	268.91	269.41	269.16	269.76	270.36	268.46	267 56	267.41	267.21	267.41	267.66	267.86
6	268.81	269.51	269.31	270.26	269.81	268.36	267.61	267.36	267.21	267.41	267.61	267.96
7	269.01	269.61	269.16	270.91	270.01	268.21	267.66	267.56	267.21	267.41	267.56	267.76
8	268.91	269.46	269.01	271.16	272.96	268.06	267.66	267.81	267.31	267.41	267.61	268.11
9	268.91	269.21	269.01	273.16	272.01	268.06	267.66	267.76	267.31	267.36	267.51	268.66
10	268.86	269.26	269.11	272.21	271.36	268.26	267.91	267.61	267.21	267.31	267.61	268.76
11	268.81	269.31	269.16	271.86	270.71	268.31	267.66	267.51	267.21	267.31	267.76	268.51
12	268.66	269.36	269.66	271.61	270.16	268.16	267.61	267.41	267.16	267.46	267.96	268.15
13	269.21	269.46	271.26	271 16	269.66	268.01	267.61	267.41	267.11	267.56	268.41	268.41
14	269.71	269.51	273.31	270.61	270.06	267.91	267.46	267.41	267.11	267.61	268.31	268.31
15	269.56	272.46	273.11	270.36	270.76	267.91	267.51	267.36	267.11	267.51	268.11	268.21
16	269.41	275.21	273.76	271.36	270.16	268.01	267.41	267.31	267.11	267.51	267.81	268.36
17	269.16	273.81	272.21	270.81	269.71	268.21	267.41	267.41	267.11	267.41	267.81	268.66
18	268.86	272.61	271.26	270.31	269.66	268.11	267.56	269.81	267.11	267.36	267.71	268.76
19	268.81	271.21	270.81	270.71	269.36	267.96	269.46	268.41	267.11	267.31	267.71	268.66
20	268.76	270.41	270.46	271.06	269.26	267.86	269.46	268.05	267.11	267.31	267.86	268.21
21	268.46	270.21	269.91	270.66	268.96	268.41	268.81	267.71	267.11	267.31	268.01	268.11
22	268.56	270.11	269.86	270.21	268.86	268.31	268.16	267.61	267.11	267.31	268.21	268.11
23	269.51	269.61	270.56	269.86	270.46	267.96	268.46	267.51	267.11	267.31	268.11	268.11
24	269.16	269.31	272.16	270.06	269.86	267.81	268.21	267.41	267.11	267.31	268.16	268.11
25	268.86	269.06	272.16	270.71	269.31	267.86	268.06	267.31	267.11	267.21	268.41	268.06
26	268.56	268.91	271.31	271.01	269.11	267.76	268.01	267.31	267.11	267.21	268.61	268.01
27	268.41	268.76	272.86	271.06	269.31	267.66	268 01	267.31	267.11	267.31	268.91	268.01
28	268.46	268.76	272.71	271.21	269.31	267.61	267.96	267.31	267.11	267.61	268.66	268.21
29	268.61	268.71	274.41	271.31	268.91	267.51	267.81	267.31	267.26	267.46	268.41	268.21
30	268.56	......	273.46	270.56	268.81	267.41	267.71	267.21	267.71	267.01	268.06	268.56
31	268.46	......	272.46	......	269.21	......	267.61	267.21	......	267.11	......	267.96

Current-meter Discharge Measurements of Mohawk River at Tribes Hill, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908.					
April 17...	Niles and Clark	3 30	3,533	4.20	14,655
Sept. 5...	Niles and Overocker	—0.60	1,549	0.352	545
Sept. 10...	Niles and Overocker	—0.50	1,603	0.400	641

SCHOHARIE CREEK DRAINAGE BASIN.

DESCRIPTION OF BASIN.

The source of Schoharie creek is about two miles east of Tannersville, at an elevation of 1,940 feet. The source is within about four miles of the easterly escarpment of the Catskill plateau.

The stream valley is broad and the slope moderate throughout the upper regions. A small area, which apparently was formerly tributary to Schoharie creek, has been cut off by erosion and has thus become tributary to Kaaterskill. Nearly the entire drainage basin is irregular and precipitous. It is extensively covered with second-growth forests.

The basin of Schoharie creek is largely overlain by slaty rocks, into which water percolates only to a slight depth. The valley soil is largely thin plastic clay, formed by disintegration of the native rocks. Passing from the head waters toward the mouth, Schoharie creek crosses successively the Devonian sedimentary rocks, chiefly of the Catskill, Oneonta, Ithaca and Hamilton formations. All of these may be considered fairly impervious and free from fissures. It then crosses belts of Silurian formations, including Helderberg, Saline, Niagara and Medina sandstone and limestone. These rocks are underlaid by impervious Hudson river shales, but are themselves permeable, yielding numerous springs at the lower partings.

The entire drainage basin is shown on the topographic maps of the U. S. Geological Survey, the elevation and area at different points along the stream being as follows:

*Drainage Area of Schoharie Creek.**

LOCATION.	DISTANCE IN MILES.†			Elevation.	FALL IN FEET.		DRAINAGE AREA IN SQUARE MILES.	
	From mouth.	From Prattsville.	Place to place.		Place to place.	Per mile.	Point to point.‡	Total.
Reservoir site	64.0	0	....	1,240	......	......	228	228
Prattsville gage	62.5	1.5	1.5	1,160	80	53.3	10.4	238.4
Devasego Falls	60.5	3.5	2.0	1,100	60	30.0	8.1	246.5
Gilboa	55.5	8.5	5.0	1,000	100	20.0	58.5	305
North Blenheim	48.5	15.5	7.0	800	200	22.3	92.9	397.9
Breakabeen	43.0	21	5.5	710	90	16.4	23.8	421.7
Middleburg	35.0	29	8	620	99	11.2	105.7	527.4
Schoharie	29.5	34.5	5.5	590	30	5.5	26.6	554
Mouth of Fox creek	28.0	36.0	1.5	585	5	3.3	90.5	644.5
Above Cobleskill cr'k.	24.0	40.0	4.0	580	5	1.2	12.8	657.3
Mouth of Cobleskill	24.0	40.0	0	580	0	......	135.9	793.2
Esperance	18.0	46.0	6.0	560	20	3.3	63.2	856.4
Burtonsville	14.5	49.5	3.5	520	40	11.4	14	870.4
Mill Point branch	6.0	58.0	8.5	340	180	21.1	30.3	900.7
Mouth (Ft. Hunter)	0	64.0	6.0	280	60	7.5	8.6	909.3

* From U. S. Geological Survey topographic maps.
† Measured along general course of stream.
‡ From head.

The results of gagings of this stream at stations formerly maintained may be found in the report of the State Engineer and Surveyor for 1902, supplement, pages 169–180.

SCHOHARIE CREEK AT FORT HUNTER, N. Y.

A gage was erected on Schoharie creek above the State feeder dam at Fort Hunter, November 17, 1904, by C. A. Poole, of this Department. The gage is maintained in coöperation with the U. S. Weather Bureau. The gage is attached to the down-stream wing wall of the right-hand abutment of the West Shore R. R. bridge. It is vertical and divided to feet and tenths and is in two sections, the lower section reading from zero to 3.9, the upper section reading from 3.9 to 16 feet. The zero mark is at elevation 280.5. Readings are taken at 8 A. M. and 6 P. M. each day. The results of current-meter measurements made during 1908 to determine the amount of diversion through the canal feeder are shown in the accompanying table.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Schoharie Creek at Fort Hunter, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	283.10	282.20	282.10	282.80	284.30	282.15	279.25	278.70	277.65	277.70	281.95	280.80
2	282.65	282.10	282.10	282.80	283.15	281.95	278.70	278.70	278.00	278.20	281.70	281.10
3	282.25	282.10	282.10	282.65	283.00	281.80	278.30	278.70	277.95	281.65	281.75	281.30
4	282.15	282.10	282.10	282.50	282.80	281.80	278.20	278.70	277.90	278.85	281.75	281.30
5	282.10	282.10	282.10	282.35	282.45	281.70	278.75	278.70	278.05	279.20	281.20	281.30
6	282.15	282.10	282.10	282.45	282.30	281.60	280.30	278.50	277.80	279.30	281.15	281.30
7	282.20	282.10	282.10	282.45	282.45	281.50	281.45	278.15	277.80	279.40	280.65	281.30
8	282.20	282.10	282.10	282.55	284.00	281.50	280.65	278.30	277.90	279.00	280.70	281.30
9	282.20	282.10	282.10	283.50	283.40	281.45	280.15	279.80	277.75	279.85	280.60	281.30
10	282.15	282.10	282.10	283.10	282.95	281.40	279.55	279.10	277.60	278.45	280.35	281.30
11	282.05	282.10	282.10	282.90	282.75	281.45	279.35	278.75	277.70	278.50	279.80	281.30
12	281.95	282.10	282.45	282.75	282.50	281.50	279.10	278.70	277.70	278.65	279.85	281.30
13	282.10	282.10	285.55	282.55	282.30	281.20	278.90	278.70	277.70	278.40	280.70	281.40
14	282.05	282.10	285.10	282.45	282.40	281.05	278.85	278.55	277.60	278.55	280.90	281.70
15	282.00	287.37	285.05	282.30	282.80	280.60	278.85	278.75	277.60	278.25	280.25	281.70
16	282.00	285.90	284.60	282.30	282.45	280.75	278.80	278.70	277.60	279.05	280.95	281.70
17	282.00	284.15	283.35	282.30	282.30	280.70	278.70	278.90	277.60	280.20	279.95	281.70
18	282.00	282.60	282.75	282.20	282.15	281.50	279.00	279.80	277.50	278.85	280.30	281.70
19	281.95	282.20	282.55	282.20	282.00	281.30	279.25	278.90	277.50	279.50	279.80	281.70
20	281.90	282.20	282.80	282.30	282.00	280.60	279.20	278.80	277.50	278.25	280.30	281.50
21	281.90	282.20	282.55	282.30	282.00	280.20	279.15	278.50	277.50	279.05	280.80	281.65
22	282.20	282.20	282.50	282.30	282.00	280.15	279.05	278.50	277.50	279.25	280.70	281.80
23	282.65	282.10	282.60	282.25	283.35	280.30	278.90	278.45	277.50	278.15	280.75	281.80
24	282.45	282.10	283.35	282.20	282.65	279.70	278.85	278.70	277.50	277.85	280.90	281.80
25	282.35	282.10	283.40	282.20	282.35	279.65	278.80	278.55	277.50	279.25	280.60	281.80
26	282.30	282.10	283.10	282.20	282.20	279.50	278.75	278.60	277.50	278.50	281.05	281.70
27	282.30	282.10	283.75	282.20	282.05	279.45	278.90	278.60	277.50	278.40	281.00	281.60
28	282.30	282.10	283.90	282.25	282.00	279.40	278.80	278.25	277.50	280.00	280.90	281.50
29	282.25	282.10	283.75	282.45	281.95	279.35	278.75	278.00	277.70	281.80	280.45	281.50
30	282.20	.....	283.75	282.30	281.85	279.10	278.70	279.10	277.70	281.95	279.90	281.60
31	282.20	.....	283.15	.....	281.80	.....	278.70	278.25	.....	281.75	.....	281.70

SCHOHARIE CREEK AT SCHOHARIE JUNCTION, N. Y.

A gaging station, established April 3, 1904, at Schoharie Junction is maintained by this Department in coöperation with the U. S. Weather Bureau. Preceding July 30 the readings during

1907 were taken by measuring down to water-surface with a steel tape from a reference point on the D. & H. R. R. bridge. Beginning July 30, 1907, a box-and-chain gage has been used. The gage is attached to the ties of the up-stream track near the right-hand end of the bridge. The standard chain length 33.00 feet. The scale is graduated to feet and tenths from zero to 14 feet. Readings are taken at 6 A. M. and 6 P. M. each day by A. M. Spencer. The gage is located a short distance below the junction of Cobleskill with Schoharie creek. Elevation of water-surface, when gage reads zero, is 565.96.

Mean Daily Elevation of Water-surface of Schoharie Creek at Schoharie Junction, N Y.

April.	May.	June.	July	Aug.	Sept.	Oct.	Nov	Dec.
570 81	572 36	568 66	566 76	566 91	566 61	567.16	567 91	566 86
570 41	570 96	568 41	566 71	566 91	566 61	567 21	567 76	566 86
569 66	570 46	568 21	566 96	566 86	566 64	567 16	567 66	566 86
569 16	569 86	568 16	567 16	566 84	566 61	567 11	567 66	567 76
569 06	569 51	567 91	567 41	566 81	566 61	567 01	567 56	567 46
569 36	569 26	567 76	567 26	566 81	566 55	566 96	567 45	566 96
569 61	569 26	567 71	567 21	566 81	566 56	566 86	567 46	566 96
570 96	572 01	567 61	567 16	566 78	566 61	566 86	567 46	567 61
572 31	571 26	567 51	567 08	566 76	566 61	566 86	567 48	567 96
570 71	570 56	567 44	567 06	566 71	566 56	566 76	567 46	567 86
570 21	570 11	567 36	567 06	566 76	566 56	566 81	567 46	567 66
569 91	569 64	567 28	567 06	566 71	566 56	567 01	567 41	567 66
569 61	569 26	567 28	567 04	566 76	566 51	567 11	567 34	567 56
569 46	569 96	567 24	567 01	566 76	566 51	567 06	567 28	567 54
569 56	570 28	567 18	566 96	566 71	566 51	567 01	567 18	567 46
569 31	569 86	567 16	566 85	566 74	566 51	566 81	567 16	567 48
569 16	569 41	567 16	566 86	566 76	566 51	566 74	567 11	567 51
569 06	568 94	567 06	566 81	566 76	566 54	566 68	567 11	567 56
569 01	568 71	567 18	566 88	566 74	566 56	566 68	567 06	567 58
569 26	568 56	567 06	566 86	566 74	566 56	566 66	567 01	567.48
569 14	568 66	567 06	566 86	566 76	566 64	566 71	566 96	567 38
568 96	569 31	566 96	566 81	566 76	566 51	566 71	566 96	567 26
568 86	571 41	566 94	566 76	566 74	566 51	566 66	566 96	567 21
568 81	570 41	566 91	566 71	566 68	566 54	566 68	566 91	567 18
568 76	569 81	566 88	566.71	566 66	566 66	566 68	566 88	567 21
568 76	568 91	566 86	567 38	566 6	566 56	566 66	566 86	567 26
568 86	568 71	566 81	567 28	566 66	566 56	566 86	566 96	567 26
568 86	568 51	566 81	567 18	566 64	566 56	568 01	566 96	567.16
568 91	568 31	566 76	567 08	566 61	566 88	568 46	566 96	567 08
568 96	568 11	566 76	566 98	566 61	567 16	568 66	566 86	567 01
.....	568 21	. . .	566 94	566 61	. . .	568.16	. .	566 96

SCHOHARIE CREEK AT MIDDLEBURG, N. Y.

A temporary gaging station was established at Middleburg August 24, 1906, by Robert E. Horton, for this Department. The gage consists of an enameled steel scale subdivided to hundredths of a foot, which is attached vertically to a pile forming part of the shore protection on the right-hand bank of the stream, about 300 feet below Middleburg bridge. The zero mark of the gage is 27.6 feet below the top of the iron rod at the upper end of the pile. The stream channel is straight for a considerable distance below

and above the gage. The bed is of gravel and cobblestones fairly smooth and permanent. The stream is confined near the right bank during low water and measurements are made by boat or by wading opposite the gage. At ordinary high stages the stream can be measured from the Middleburg bridge. Gage readings are taken each morning and night by Minnie E. Wheeler.

Mean Daily Gage Height, in Feet, of Schoharie Creek at Middleburg, N. Y.

DAY.	Dec.
1908.	
1	1 35
2	1 35
3	1 32
4	1 18
5	1.20
6	1 30
7	1 32
8	2 28
9	2 32
10	2 18
11	1 88
12	1 90
13	2 05
14	1.62
15	1.82
16	1 86
17	1 92
18	1.90
19	1.82
20	1 65
21	1 58
22	1.85
23	1 88
24	1 80
25	1 58
26	1.58
27	1 58
28	1 62
29	1 68
30	1 82
31	1 65

Current Meter Discharge Measurements of Schoharie Creek at Middleburg, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Dis-charge.
		Feet	*Square feet*	*Ft per second*	*Second-feet.*
1908.					
Oct. 12*a*	Clark and Patchke	1 25	170	0 429	72 9
Oct 13*b*	Clark and Patchke	1 25	488	0 122	59 5
Oct. 13*a*	A. R Patchke	1 26	169	0 422	71 3

a Boat measurement. *b* Bridge measurement.

Mean Daily Discharge, Second-feet, of Schoharie Creek at Middleburg, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.					
1		141	70	345	898
2		114	65	300	516
3		101	60	256	459
4		120	52.5	234	598
5		95	49	212	598
6		84	49	204	898
7		74	49	196	1,580
8		65	49	180	2,700
9		56	49	172	3,140
10		56	49	156	3,500
11		49	56	164	3,725
12		70	65	196	1,850
13		74	65	212	1,640
14		60	56	196	1,377
15		49	56	180	1,193
16		42	49	172	1,760
17		42	49	188	1,078
18		36.5	45.5	718	752
19		36.5	42	4,130	431
20		33.8	278	2,175	431
21		36.5	812	1,940	752
22		49	614	1,880	898
23		234	445	1,377	681
24	114	141	334	1,124	459
25	90	90	300	919	300
26	70	70	940	834	404
27	79	65	549	770	459
28	834	56	459	770	418
29	345	52.5	404	[illegible]	390
30	223	56	356	500	390
31	172		368	...	700
Mean	241	75.0	222	712	1,125

Mean Daily Discharge, Second-feet, of Schoharie Creek at Middleburg, N. Y.

DAY.	aJan.	bFeb.	Marc[illegible]
1907.			
1	3,100		b
2	1,170		b
3	940		b
4	1,850		b
5	1,285		b
6	1,009		b
7	1,055		b
8	1,700		b
9	1,700		b
10	919		b
11	965		b
12	834		b
13	752		b
14	700		b
15	1,170		2,4[illegible]
16	735		1,4[illegible]
17	1,580		1,3[illegible]
18	1,550		1,4[illegible]
19	1,940		1,0[illegible]
20	2,420		6[illegible]
21	1,055		6[illegible]
22	630		9[illegible]
23	752		2,2[illegible]
24	645		2,3[illegible]
25	614		1,6[illegible]
26	752		1,5[illegible]
27	735		1,4[illegible]
28	735		1,2[illegible]
29	770		2,9[illegible]
30	700		2,4[illegible]
31	[illegible]		1,8[illegible]
Mean	1,141		1,6[illegible]

a Stream partly frozen over. b Ice obstruction.

Mean Daily Discharge, Second-feet, of Schoharie Creek at Middleburg, N. Y.

DAY.		May.	J[illegible]	July.	Aug.	Sept.	Oct.	Nov.	Dec.†
1908.									
1	5	7,575	898	65	60	26.5	95	390	84
2	0	2,593	648	65	52.5	26.5	79	322	84
3	0	2,280	500	127	42	22	95	256	79
4	9	1,790	404	278	42	22	79	256	52.5
5	8	1,354	356	196	56	22	60	234	56
6	9	1,147	311	290	49	18.1	49	204	74
7	8	1,285	278	164	56	18.1	49	164	79
8	9	4,900	223	134	49	18.1	45.5	204	431
9	5	2,525	212	114	45.5	18.1	42	164	459
10	5	2,210	278	79	39.2	18.1	39.2	148	379
11	0	1,760	245	70	42	18.1	42	156	245
12	0	1,377	204	65	36.5	18.1	65	156	256
13	0	1,147	188	60	52.5	18.1	60	172	322
14	9	1,550	172	56	56	18.1	52.5	134	156
15	4	1,580	148	56	52.5	18.1	49	134	223
16	0	1,239	188	52.5	42	14.2	45.5	134	234
17	3	1,055	345	42	36.5	14.2	42	127	267
18	2	919	204	49	26.5	14.2	33.8	134	256
19	6	770	172	56	31	14.2	31	134	223
20	9	652	141	56	31	14.2	33.6	120	164
21	3	682	120	42	31	14.2	36.5	120	141
22	2	3,905	114	39.2	33.8	14.2	36.5	148	234
23	9	3,100	101	36.5	36.5	14.2	36.5	108	245
24	8	1,850	95	45.5	31	14.2	31	101	212
25	9	1,285	95	60	31	14.2	28.8	114	141
26	3	1,009	84	234	26.5	14.2	31	108	141
27	8	876	84	196	26.5	14.2	516	95	141
28	7	700	70	134	26.5	14.2	532	95	156
29	2	598	56	101	26.5	26.8	966	90	172
30	3	549	60	70	24.2	134	665	79	223
31	.	1,193	. .	74	26.5	.	532	. . .	164
Mean	3	1,790	233	103	[illegible]	21.6	146	160	197

b Ice obstruction. † A little ice obstruction.

Monthly Discharge of Schoharie Creek at Middleburg, N. Y.
[Drainage area, 527 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1906. a					
August, 8 days	834	70	241	0.458	0.527
September	234	33.8	75.0	0.142	0.159
October	940	42.0	222	0.422	0.485
November	4,130	156	712	1.35	1.51
December	3,725	300	1,125	2.14	2.46
1907.					
January	3,100	598	1,141	2.17	2.50
February*b*	....	....	....	....	....
March, 17 days	2,980	648	1,643	3.12	3.59
April	4,085	598	1,248	2.37	2.65
May	1,610	431	885	1.68	1.93
June	1,430	127	462	0.878	0.983
July	334	74	159	0.302	0.347
August	65	18.1	33.4	0.063	0.072
September	1,520	18.1	281	0.534	0.598
October	5,760	245	983	1.87	2.15
November	20,500	459	2,185	4.15	4.65
December	10,680	379	1,985	3.77	4.34
1908.					
January, 19 days	1,580	500	801	1.52	1.75
February, 14 days	7,445	549	1,527	2.90	3.13
March	6,240	500	2,076	3.94	4.53
April	3,725	898	1,383	2.62	2.93
May	7,575	549	1,790	3.40	3.91
June	898	56	233	0.442	0.495
July	334	36.5	103	0.195	0.224
August	60	24.2	39.6	0.075	0.086
September	134	14.2	21.6	0.041	0.046
October	986	28.8	146	0.277	0.318
November	390	79	160	0.304	0.340
December	459	52.5	197	0.374	0.430

b Ice obstruction.

SCHOHARIE CREEK AT PRATTSVILLE, N. Y.

Schoharie creek above Prattsville drains a rugged, mountainous area, almost entirely wooded. The watershed, 238 square miles in extent, lies wholly within Greene county. Rocks of the Catskill formation, chiefly sandstones and conglomerates, lie at or near the surface over most of the area. The basin is surrounded by nearly continuous mountain ranges, and intervening ridges divide the main stream from its principal tributaries — Batavia kill, East kill and West kill.

The gaging station was established November 7, 1902, by Robert E. Horton for the U. S. Geological Survey in coöperation with the New York Water Supply Department, on the highway bridge. It was assumed and continued by the Board of Water Supply of the city of New York on May 7, 1907, at which time a new standard Board of Water Supply chain gage was installed. The old

datum was preserved and the present readings conform to those already obtained.

The gage is attached to the floor of the bridge on the up-stream side near the left bank. The chain length is 27.05 feet. The elevation of the datum of the gage is 1130.03 (U. S. G. S. B. M.). The gage datum is referred to a bench-mark — a circle of white paint marked on a boulder at the right end of the down-stream side of the bridge, elevation, 1151.00, or 20.97 above the datum of the gage.

Gage readings are made each morning and evening by Miss Enda M. Snyder of Prattsville, N. Y.

The bridge is a single span steel highway bridge, 187.8 feet between abutments, and all the water passes between them at all but the very highest stages.

In high water, measurements are made from the bridge, while in low-water stages they may be made by wading at a point about 500 feet below the bridge.

Mean Daily Discharge, Second-feet, of Schoharie Creek at Prattsville, N. Y.c

DAY.	bJan.	bFeb.	bMar.	April.	bMay.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	1,130	250	100	620	a620	230	190	45	15	550	840	280
2	620	270	105	550	620	350	120	45	25	375	690	230
3	490	260	110	460	620	1,480	120	45	45	300	a6,525	230
4	1,030	200	105	430	620	1,080	90	45	55	1,060	1,975	230
5	620	240	100	400	1,030	760	80	32	430	840	1,240	350
6	490	200	95	350	a900	930	80	32	170	550	1,360	325
7	550	170	90	300	620	690	120	45	90	430	a13,100	230
8	885	160	95	325	930	550	105	32	80	885	3,070	230
9	760	160	100	325	690	490	90	25	90	760	1,840	210
10	550	160	95	325	620	430	80	25	155	550	1,240	a10,100
11	490	150	90	325	550	375	90	25	230	430	930	3,900
12	430	140	100	400	490	325	280	25	885	550	725	1,720
13	375	130	a100	460	430	280	190	15	350	430	620	1,025
14	a320	140	3,900	490	375	255	140	25	230	375	550	840
15	300	150	2,240	490	325	230	105	15	170	325	430	760
16	260	140	620	460	430	230	90	8	140	280	400	690
17	240	130	620	460	760	190	120	15	120	255	350	550
18	300	120	550	430	550	155	190	15	90	230	325	550
19	370	130	430	430	550	155	190	25	80	230	350	490
20	800	130	430	400	490	190	140	15	65	230	325	460
21	600	130	230	375	430	155	170	8	105	230	325	430
22	400	140	490	430	375	140	140	8	120	230	325	430
23	350	150	1,130	585	325	120	120	15	155	190	280	2,520
24	300	150	1,130	2,520	300	105	105	8	690	155	280	3,415
25	350	150	840	1,360	280	105	80	15	375	155	300	1,480
26	440	120	620	1,360	325	90	65	25	255	170	300	1,090
27	400	110	350	1,030	400	120	65	8	230	170	325	840
28	360	100	1,660	760	400	90	45	8	190	a6,040	325	1,240
29	330	.....	1,480	690	325	90	45	15	980	4,440	350	1,240
30	280	.....	1,240	620	280	155	45	15	1,030	1,975	300	930
31	220	.....	840	.....	255	.....	45	15	.....	690	.....	1,360
Mean	485	160	648	605	510	352	114	22	255	778	1,333	1,238

a Estimated. *b* Discharge from January 14 to March 13, inclusive, estimated; also from May 1 to May 6, inclusive. *c* This table supersedes the one given in 1907 report, p. 492.

Mean Daily Discharge, Second-feet, of Schoharie Creek at Prattsville, N. Y.

DAY.	June.	July.	Aug.	Sept.	Oct.	Nov.	*b*Dec.
1906.							
1	590	45	27	16	54	268	[illegible]
2	410	80	27	8	60	235	49
3	230	124	27	16	48	216	46
4	265	153	35	11	43	156	66
5	255	355	40	13	39	*c*138	85
6	215	165	40	13	39	119	66
7	185	71	35	17	*c*39	165	300
8	135	71	35	11	*c*38	99	350
9	140	52	31	8	29	85	280
10	155	37	35	*c*9	19	106	260
11	165	52	31	11	39	99	350
12	125	27	35	16	39	85	434
13	105	31	42	8	39	72	242
14	80	27	40	8	40	60	230
15	90	27	40	7	39	66	205
16	185	24	31	*c*7	35	72	290
17	155	31	*c*40	7	29	78	205
18	125	24	40	7	29	72	172
19	90	24	35	7	39	66	172
20	80	24	31	7	39	66	165
21	65	*c*24	31	7	31	92	165
22	65	28	[illegible]	7	27	72	148
23	70	27	31	7	19	66	172
24	40	24	29	7	29	66	172
25	40	184	26	7	29	66	205
26	50	220	31	8	72	60	234
27	45	113	33	8	785	66	150
28	30	89	31	15	410	60	150
29	35	89	31	148	*c*784	60	145
30	40	60	31	100	[illegible]	66	136
31	. .	37	31	.	410		242
Mean	145	75	33	17	129	100	194

a January 7 to February 13, inclusive, discharge estimated, because of ice obstruction.
b December 7 to December 31, inclusive, lower gage in open water used. *c* Meter measurement.

Monthly Discharge of Schoharie Creek at Prattsville, N. Y.
[Drainage area, 240 square miles.]

MONTH.	Discharge in Second-feet.			Total in millions of gallons.	Run-off.			Rainfall in inches.
	Maximum.	Minimum.	Mean.		Second-feet per square mile.	Depth in inches.	Per cent of rainfall.	
1907.								
January	1,130	220	485	9,721	2.02	2.328	114	2.04
February	270	100	160	2,893	0.67	.694	42	1.64
March	1,660	90	648	12,982	2.70	3.110	334	.93
April	2,520	300	605	11,738	2.52	2.809	122	2.30
May	1,030	255	510	10,213	2.12	2.449	74	3.33
June	1,480	90	352	6,815	1.47	1,635	52	3.14
July	280	45	114	2,287	0.48	.546	16	3.51
August	45	8	22	450	0.09	.104	14	.74
September	1,030	15	255	4,943	1.06	1.186	15	7.87
October	6,040	155	778	15,576	3.24	3.735	69	5.40
November	13,100	280	1,333	25,848	5.56	6.192	96	6.43
December	10,100	210	1,238	24,796	5.16	5.953	126	4.73
The year	13,100	8	542	128,262	2.26	30.741	73	42.06
1908.								
January	620	300	429	8,596	1.79	2.061	70	2.93
February	8,000	144	763	14,299	3.18	3.429	62	5.51
March	3,410	210	992	19,878	4.13	4.765	206	2.31
April	1,800	440	720	13,956	3.00	3.345	125	2.68
May	3,740	330	957	19,182	3.99	4.602	61	7.53
June	590	30	145	2,818	0.60	0.675	30	2.22
July	355	24	75	1,515	0.31	0.365	8	4.36
August	42	25	33	667	0.14	0.157	7	2.32
September	148	7	17	337	0.07	0.081	3	2.82
October	784	19	129	2,587	0.54	0.620	14	4.31
November	268	60	100	1,937	0.42	0.464	106	0.44
December	434	46	194	3,895	0.81	0.935	46	2.01
The year	8,000	7	380	89,667	1.58	21.499	55	39.44

MOHAWK RIVER AT FULTONVILLE BRIDGE, FONDA, N. Y.

This gaging station was established April 29, 1906, by R. H. Merrill, for this Department. A box-and-chain, reading decimally from zero to 12 feet, is located on the down-stream guard-rail of the middle span of the bridge. The standard chain length is 29.03 feet and the gage datum is 270.00. A bench-mark, consisting of a chiseled square on the northeast corner of the wing wall of the south abutment of the bridge, is at elevation 295.75. The stream channel is straight and the river uniform for about one-half mile above and below the bridge. The river becomes ice covered in winter, but the conditions are generally good for current-meter measurements. The bridge comprises three spans and is subdivided to five-foot intervals on the down-stream side, the initial point being at the face of the left-hand abutment.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Fultonville Bridge, Fonda, N. Y.

DAY.	Oct.	Nov.	Dec.
1908			
1	74 40	274 15	274 75
2	74 60	274 00	275 10
3	73 95	273 90	274 75
4	73 85	273 85	274 75
5	73 75	273 85	274 65
6	73 65	273 80	274 60
7	73 75	273 90	274.45
8	73 75	274 00	274 35
9	73 65	274 00	a
10	73.70	274 05	a
11	73 70	274 25	a
12	73 85	274 40	a
13	74 05	274 90	a
14	74 00	274 70	a
15	73 80	274 45	a
16	73 65	274 35	a
17	73 75	274 25	a
18	73 75	274 25	a
19	73 70	274 25	a
20	73 65	274 30	a
21	73 60	274 55	a
22	73 65	274 65	a
23	73 65	274 75	a
24	73 65	274 55	a
25	73 50	274 90	a
26	73 60	274 75	a
27	73 70	275 20	a
28	73 95	275 65	a
29	74 30	275 20	a
30	74 50	277 65	a
31	74 35	..	a

a No record.

MOHAWK RIVER AT CANAJOHARIE, N. Y.

A gaging station was established by this Department at the highway bridge crossing Mohawk river at Canajoharie, September 16, 1908. The gage is of the weight-and-chain variety, contained in a box of standard form fastened to the hand-railing of the upstream side of the bridge. The gage reads from zero to 11 feet by feet and tenths. Length of gage chain from end of weight to marker is 42.35 feet. The drainage area at this gaging station is given as 1,862 feet in the Barge canal report of 1901. Gage readings are taken each morning and night. The observers were M. J. Powers, from September 16, 1908, to January 31, 1909, and H. M. Hoag, beginning February 1, 1909.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Canajoharie, N. Y.

DAY.	Sept.	Oct.	Nov.	Dec.
1908.				
1	......	285.20	284.95	285.85
2	......	284.95	284.65	286.35
3	......	284.60	284.50	286.00
4	......	284.25	284.25	285.65
5	......	284.05	284.50	285.55
6	......	283.80	284.50	285.45
7	......	284.10	284.50	285.95
8	......	284.05	284.45	287.05
9	......	284.00	285.00	287.55
10	......	284.05	285.00	287.25
11	......	283.95	285.25	287.35
12	......	284.85	285.95	287.25
13	......	285.00	286.60	287.25
14	......	284.80	285.95	287.60
15	......	284.65	285.65	286.95
16	283.45	284.45	285.35	286.95
17	283.45	284.20	285.30	287.20
18	283.60	284.00	284.85	287.10
19	283.55	283.95	285.50	287.45
20	283.60	284.10	285.60	287.20
21	283.65	283.90	286.50	286.80
22	283.60	284.05	286.30	287.20
23	283.45	284.00	286.05	286.70
24	283.45	283.90	286.15	286.55
25	283.50	283.65	286.85	286.45
26	283.65	283.65	287.35	286.65
27	283.55	284.05	287.20	286.75
28	283.45	284.60	287.05	286.95
29	284.10	285.60	286.40	286.55
30	285.30	285.75	286.05	286.40
31	......	285.40	......	286.25

MOHAWK RIVER AT FORT PLAIN, N. Y.

A gage was established on the highway bridge crossing the Mohawk river at Fort Plain, December 30, 1905, by C. A. Poole, for this Department. A box-and-chain gage is attached to the bridge guard-rail on the down-stream side, 50 feet from the right-hand abutment. The elevation of water-surface, when the gage reads zero, is 290.47. The standard chain length is 29.30. The bridge is subdivided to five-foot sections for current-meter measurements. The initial point is the face of the left-hand abutment on the down-stream side of the bridge.

*Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Fort Plain, N. Y.**

DAY.	Jan.	Feb.	Mar.	April.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	*a*	293.13	295.23	297.05	298.66	295.26	291.34	291.02	290.35	291.62	291.45	292.77
2	*a*	293.08	295.38	296.50	298.71	294.61	291.29	290.89	290.29	291.47	290.95	292.82
3	*a*	293.03	296.33	295.90	296.96	294.16	291.07	290.57	290.32	291.15	291.12	292.52
4	*a*	293.03	296.68	295.50	295.36	293.36	290.87	290.62	290.32	291.02	291.05	292.02
5	*a*	292.98	296.23	294.85	295.21	293.32	290.91	290.75	290.32	290.82	*a*	292.22
6	*a*	292.93	295.48	295.85	294.76	292.52	291.04	291.35	290.32	290.79	290.92	292.22
7	*a*	292.93	295.38	296.35	295.11	292.32	291.21	291.82	290.57	290.75	291.27	293.32
8	*a*	292.83	295.38	297.50	297.76	292.12	291.49	291.97	290.47	290.65	291.15	293.42
9	*a*	292.83	295.03	299.25	297.11	292.37	292.04	291.47	290.41	290.57	291.35	293.77
10	*a*	292.93	294.88	298.10	296.61	292.72	291.99	291.17	290.50	290.65	291.72	293.19
11	*a*	292.93	294.73	298.10	295.51	292.52	291.51	291.08	290.42	291.22	292.33	292.47
12	*a*	293.03	295.88	297.35	294.66	292.12	291.29	290.99	290.29	291.47	292.59	292.77
13	*a*	293.03	298.78	296.55	294.46	291.87	291.21	290.77	290.32	291.52	293.89	292.79
14	*a*	293.13	300.58	295.80	295.06	291.77	291.14	290.79	290.52	291.29	294.37	292.95
15	*a*	298.63	300.68	295.50	295.51	291.77	291.07	290.65	290.22	291.27	292.39	292.97
16	*a*	303.78	301.83	296.95	295.21	292.67	291.01	290.55	290.19	291.02	292.12	293.62
17	*a*	304.43	300.03	296.30	294.91	292.52	291.09	290.69	290.19	290.85	291.89	293.52
18	*a*	301.38	298.63	296.36	294.61	292.07	291.92	294.75	290.29	290.79	291.82	292.99
19	*a*	299.98	297.48	296.31	294.16	291.82	292.84	292.62	290.17	290.79	291.99	292.89
20	*a*	299.98	296.28	296.46	293.76	292.14	292.66	292.07	290.37	290.57	292.19	292.82
21	*a*	298.63	295.18	295.86	293.66	293.64	293.27	291.62	290.37	290.85	292.82	292.65
22	*a*	297.88	294.58	295.31	293.66	292.59	293.02	291.12	290.25	290.72	292.42	292.52
23	*a*	296.93	295.43	295.01	294.31	292.04	293.47	291.09	290.17	290.52	292.55	292.09
24	*a*	296.48	297.63	295.61	293.96	291.94	292.53	290.55	290.17	290.45	292.92	291.97
25	*a*	296.03	296.58	296.66	293.51	291.87	292.79	290.47	290.22	290.45	293.32	292.09
26	*a*	295.63	296.53	296.91	293.96	291.71	292.47	290.55	290.27	290.65	293.85	292.17
27	*a*	295.28	298.68	297.31	294.41	291.54	292.42	290.42	290.25	290.75	293.87	292.35
28	*a*	295.13	298.88	297.26	294.06	291.19	291.99	290.39	290.17	291.25	293.52	292.82
29	*a*	295.28	300.53	297.01	293.46	291.11	291.58	290.35	291.72	291.89	293.12	292.19
30	*a*	......	299.63	296.16	293.86	291.37	291.39	290.27	291.97	292.27	292.57	292.12
31	*a*	......	298.43	......	294.26	......	291.07	290.25	......	292.17	......	292.17

a Record missing. * Water-surface elevations previously published for years 1905, 1906 and 1907 should have a correction of —0.91 applied to all elevations.

Current-meter Discharge Measurements of Mohawk River at Fort Plain, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
April 17...	Weeks and Patchke	5.47	2,473	4.40	10,888
May 1...	Clark and Patchke	8.09	3,367	6.12	20,620
May 2...	Clark and Patchke	7.70	3,239	5.74	18,579
May 2...	Clark and Patchke	8.26	3,434	6.22	21,352
May 15...	E. F. Weeks	4.51	2,137	3.43	7,319
Aug. 27...	E. C. Niles	−0.08	724	0.465	337
Sept. 3...	Niles and Overocker	−0.60	636	0.408	260
Sept. 10...	Niles and Overocker	−0.42	676	0.458	310

GAROGA CREEK AT ROCKWOOD, N. Y.

Measurements of the discharge of Garoga creek at the Shirt Factory Company's dam at Rockwood, N. Y., were made during a portion of the months of July and August, 1908, by C. E. Parsons, who has furnished the results for publication. Discharge was obtained by means of two weirs, one of which, having a crest length of 93.6 feet was located on the main stream on the crest

of the water power dam. The other weir, having a crest length of 6.1 feet, was located in the tailrace of the shirt factory. The discharge was calculated by means of the Francis formula. Drainage area at the point of gaging is approximately 50 square miles.

Flow of Garoga Creek near Rockwood, N. Y.

[Drainage area, 50 square miles.]

DATE.	Discharge in second-feet.	DATE.	Discharge in second-feet.	DATE.	Discharge in second-feet.
1903.		1903.		1903.	
July 14	15.5	July 23	32.6	July 31	52.8
July 15	22.7	July 24	27.1	Aug. 1	33.3
July 17	26.4	July 25	43.9	Aug. 2	29.7
July 18	115.0	July 26	50.3	Aug. 3	31.3
July 19	75.9	July 27	54.5	Aug. 4	27.7
July 20	40.2	July 28	68.2	Aug. 5	20.2
July 21	22.2	July 29	64.9	Aug. 6	58.0
July 22	51.3	July 30	53.5	Aug. 7	31.1

EAST CANADA CREEK AT DOLGEVILLE, N. Y.

A gaging station on this stream was established for the U. S. Board of Engineers on Deep Waterways in 1898. It has since been maintained by the U. S. Geological Survey in coöperation with this Department.

Observations are taken at High Falls, near Dolgeville, about 7 miles from the outlet of the stream. The gaging station is located at the dam of the Herkimer County Light and Power Company. The dam is of rubble masonry, 19 feet high, and has a flat crest 6 feet wide and 190.25 feet long between abutments. The elevation of the up-stream edge of the crest is 1 foot below that of the lip. The impounded water is conducted to the power-house, 500 feet below the dam, through a wrought-iron flume, 10 feet in diameter.

Readings of the depth on the crest are taken from a vertical gage board attached to the bulkhead, 6 feet up-stream, twice each day by Godfrey Aman. The mean of the readings is used in computing the discharge. A record is also kept of the run of the water-wheels and the elevation of water in the tail-race. The record since January 1, 1903, has been computed from a discharge curve based on the United States Geological Survey experiments on a full-sized model of the dams, made at Cornell University.

The flow through the turbines for this period has also been computed from current-meter measurements, made in the tail-race of the electric power-plant instead of from the manufacturer's rating tables for the water-wheels, as formerly. The turbines are of a special Victor cylinder-gate type. The two main wheels are each 36 inches in diameter, and their speed is controlled by Lombard governors. Beginning November 12, 1907, a pair of 36-inch Rodney Hunt turbines have also been in use. Owing to changing flashboard conditions, the record for 1908 is approximate only. During the winter the dam is more or less obstructed by ice at times. The reduction in flow is estimated.

Spruce creek, the principal tributary of East Canada creek, enters 1 mile above Dolgeville, and drains an area of 50 square miles. Water is diverted from this creek and from Beaver creek, one of its tributaries, at Diamond Hill, and is carried to Little Falls through a cast-iron conduit, 9 miles long. The water-supply of Dolgeville is taken from Cold brook, a tributary of East Canada creek. No allowance for diversion of water-supply has been made in computing the run-off for East Canada creek.

Current-meter Discharge Measurements of Tail Race of Herkimer County Light & Power Co., Dolgeville, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
June 10...	Newton and Patchke..................	3.25	72.2	3.43	248
June 11...	Newton and Patchke..................	3.25	68.3	3.44	235
June 11...	Newton and Patchke..................	3.05	70.2	3.02	212
June 11...	Newton and Patchke..................	3.18	70.2	3.12	219
June 11...	Newton and Patchke..................	3.30	72.7	3.64	265
Sept. 25...	Newton and Niles.....................	2.40	55.6	1.87	104

Mean Daily Discharge, Second-feet, of East Canada Creek at Dolgeville, N. Y.

DAY.
1906.
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Mean

a Pond empty. *b* Record not available. * Indicates Sundays.

Monthly Discharge of East Canada Creek at Dolgeville, N. Y.
[Drainage area, 256 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1906.					
January	868	135	401	1 57	1 81
February	3,414	170	724	2 83	3.06
March	3,299	314	1,117	4 37	5.03
April	4,302	840	2,072	8 10	9.07
May	3,878	590	1,210	4 73	5 44
June	1,030	74	313	1.22	1.37
July	945	85	264	1 03	1 18
August	506	85	171	0.669	0.769
September	365	32	124	0 485	0 543
October	338	95	138	0 540	0.621
November	968	95	308	1.[redacted]	1.34
December	833	74	297	1.16	1.33

MOHAWK RIVER AT LITTLE FALLS, N. Y.

A gaging station was established at the lower (Gilbert's) dam at Little Falls, N. Y., for the United States Board of Engineers on Deep Waterways in 1898. It has since been maintained by the U. S. Geological Survey in coöperation with this Department. The dam is of masonry, having the form of a circular arc, and furnishes power for the Astoronga Knitting Mill and the mill of the Little Falls Paper Company. Records of the crest gage and run of the water-wheels at the Astoronga mill are taken by John Schmelze. At the paper mill a record has been kept, beginning June 1, 1907, by C. T. Barrett.

There are three dams at Little Falls. The upper one is a State dam, diverting water for the supply of the Erie canal; the lower two are used for water-power development. The gage record kept at the lower dam shows the amount of water flowing down-stream from Little Falls, but does not include the diversion at the State dam above the gaging station, and hence does not represent the total yield from the tributary drainage area of about 1,306 square miles.

Mean Daily Discharge, Second-feet, of Mohawk River at Little Falls, N. Y.

ı.	Sept.	Oct.	Nov	Dec.
62	684	873	*720	1,729
49	518	684	918	2,204
78	607	657	947	2,885
06	641	*596	911	1 236
29	451	547	860	1,314
91	*297	576	704	*725
27	449	490	784	1,275
94	576			2,218
32	684			2,409
00	547			1,461
67	576			1,173
32	490			1,260
67	*384	1		*1,302
67	607			1,550
92	547			1,820
92	493			2,437
87	464			2,496
77	493			1,893
74	329			1,547
94	*449			*1,619
51	493			1,839
34	427			1,419
01	427			1,262
41	427			923
84	464			780
07	366			1,146
84	*368			*921
41	493			1,213
93	912	1		1,262
84	1,295	1		1,142
18		1		1,061
331	532			1,536

* Indicates Sundays.

Monthly Discharge of Mohawk River at Little Falls, N. Y.
[Drainage area, 1,306 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET			RUN-OFF.	
	Maximum	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	5,817	1,232	2,139	1.64	1 89
February	18,387	675	3,440	2 63	2 84
March	13,342	974	5,500	4 21	4 84
April	9,351	3,198	5,898	4 52	5 06
May	9,186	1,818	4,116	3 15	3 62
June	5,115	458	1,598	1 22	1.37
July	5,454	527	1,356	1 04	1 20
August	2,077	384	831	0 636	0 731
September	1,295	297	532	0 407	0 456
October	1,497	411	745	0 571	0 657
November	3,273	561	1,476	1.13	1 27
December	2,885	725	1,536	1.18	1.36

Current-meter Discharge Measurements of Raceway, Little Falls Paper Co., Little Falls, N. Y.

DATE.	Hydrographer.	Meter No.	Gage height.	Area of section.	Mean velocity.	Discharge.
			Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1905.						
Aug. 31..	C. A. Poole	717	a7.00	65	2.66	b173
Sept. 2..	C. A. Poole	717	a7.50	58	3.66	b212
Nov. 14..	C. A. Poole	360	a7.00	65	3.66	b238
1907.						
May 18..	E. C. Niles	360	c8.10	121	......	329
May 24..	E. F. Weeks	462	c8.50	119	......	311
June 11..	E. C. Niles	360	c8.40	127	......	322
July 23..	E. C. Niles	360	c8.92	104	......	292
June 22..	R. E. Horton	462	c9.20	......	......	....

a Water-surface below bridge floor. b Old canal at State dam, Hansen avenue. c Below reference point.

Current-meter Discharge Measurements of Headrace, Little Falls Paper Co., Little Falls, N. Y.

DATE.	Hydrographer.	Gage height.a	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908.					
May 14...	Weeks and Clark	7.02	153	3.05	467
Oct. 5...	Weeks and Quinn	9.25	112	1.85	207

a Reference point is top of wall, left-hand, down-stream side of bridge across raceway.

MOHAWK RIVER ABOVE STATE DAM AT LITTLE FALLS, N. Y.

This gage was established November 18, 1904, by E. A. Lamb and is maintained by this Department in coöperation with the United States Weather Bureau. A vertical gage with painted tenth-foot marks reading from zero to 12 feet is attached to the down-stream portal wall of the discharge culvert of Erie canal waste-weir No. 12 on the right-hand bank of Mohawk river 400 feet up-stream from Hansen avenue. The State dam at Little Falls is a low, timber structure located on the ledge at the head of the falls. The stream is divided by an island, the left-hand wing of the dam being at the upper and the right-hand wing at the lower end of the island. The old Erie canal at the left-hand end of the dam is utilized as a mill-race. At the right-hand end water is diverted for power purposes through Whitman's race. The Erie canal feeder is also located at the right-hand end of the dam. Measurements to determine the flow in these channels during 1908 are given in the accompanying tables. The elevation of the zero mark of the gage is at 360.31. Readings were taken each morning and afternoon by William Quackenbush, preceding December 1, 1907, and by John Stark after that date.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River above State Dam at Little Falls, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	364.66	363.66	363.81	365.61	366.16	364.86	363.51	363.71	363.31	363.11	363.31	363.71
2	364.56	363.71	363.86	365.26	366.46	364.41	363.51	363.71	363.31	363.16	363.21	363.71
3	364.51	363.71	364.21	365.11	365.66	364.36	363.51	363.61	363.31	363.21	363.16	363.61
4	364.41	363.71	364.26	364.76	365.31	364.11	363.51	363.61	363.31	363.21	363.11	363.61
5	364.31	363.71	364.21	364.61	364.86	363.91	363.51	363.61	363.31	363.21	363.11	363.61
6	364.31	363.71	364.11	365.16	364.96	363.91	363.51	363.61	363.31	363.21	363.16	363.61
7	364.31	363.81	364.11	365.31	365.71	363.76	363.51	363.71	363.31	363.21	363.31	363.61
8	364.31	363.81	364.11	365.56	365.76	363.71	363.51	363.81	363.31	363.11	363.51	363.91
9	364.21	363.81	364.11	366.36	365.61	363.71	363.81	363.76	363.31	363.11	363.51	364.16
10	364.21	363.81	364.11	366.11	365.46	363.91	363.66	363.71	363.31	363.36	363.51	363.86
11	364.11	363.91	364.11	365.96	364.91	363.86	363.61	363.71	363.31	363.41	363.61	363.71
12	364.11	363.91	364.96	365.61	364.61	363.71	363.51	363.71	363.31	363.31	363.81	363.71
13	364.41	363.91	364.86	365.16	364.46	363.61	363.51	363.71	363.31	363.31	363.81	363.81
14	364.41	363.91	365.76	365.01	364.61	363.51	363.51	363.71	363.11	363.21	363.81	363.86
15	364.16	365.41	366.46	365.06	364.96	363.51	363.51	363.81	363.11	363.11	363.81	363.81
16	363.91	368.81	366.66	365.31	364.81	363.51	363.61	363.71	363.11	363.11	363.76	364.01
17	363.91	368.21	366.86	365.11	364.61	363.51	363.61	363.71	363.11	363.11	363.46	364.01
18	363.91	366.21	365.61	364.86	364.46	363.51	364.01	364.01	363.11	363.11	363.41	363.86
19	363.91	365.41	365.26	365.16	364.31	363.51	364.11	364.01	363.11	363.11	363.41	363.71
20	363.91	365.11	364.91	365.21	364.31	363.51	364.56	363.86	363.11	363.11	363.41	363.71
21	363.91	364.91	364.71	364.96	364.11	363.51	364.06	363.81	363.11	363.11	363.91	363.71
22	364.01	364.66	364.61	364.66	364.11	363.71	363.91	363.81	362.96	363.11	363.91	363.66
23	364.06	364.36	364.91	364.61	364.36	363.71	363.91	363.61	362.91	363.11	363.91	363.51
24	363.86	364.11	365.56	365.06	364.26	363.51	363.91	363.56	363.01	363.11	363.91	363.51
25	363.71	364.11	365.31	365.21	364.11	363.51	363.91	363.51	363.01	363.11	364.01	363.61
26	363.71	364.01	365.46	365.26	364.16	363.51	363.91	363.51	363.01	363.11	364.31	363.61
27	363.81	363.96	366.11	365.71	364.41	363.51	363.81	363.51	363.01	363.11	364.16	363.61
28	363.71	363.91	366.31	365.66	364.26	363.51	363.76	363.41	363.01	363.11	364.11	363.51
29	363.71	363.91	367.31	365.01	364.01	363.51	363.71	363.31	363.01	363.41	363.91	363.61
30	363.51	. . .	366.96	365.11	363.91	363.51	363.71	363.31	363.06	363.71	363.81	363.61
31	363.51	. . .	366.16	. . .	364.06	. . .	363.71	363.31	. . .	363.46	. . .	363.61

Current-meter Discharge Measurements of Erie Canal Feeder, Little Falls, N. Y.

DATE.	Hydrographer.	Meter No.	Gage height.	Area of section.	Mean velocity.	Discharge.
			Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1905.						
Aug. 31	C. A. Poole	717	*a*5.4	86	2.03	175
Sept. 2	C. A. Poole	717	*a*5.3	88	1.67	147
Nov. 14	C. A. Poole	360	*a*5.5	84	1.93	162
1907.						
May 14	E. C. Niles	313	*c*5.90	83	......	114
May 24	Horton and Weeks	462	*c*5.20	87	......	131
June 11	E. C. Niles	360	*c*5.45	82	......	187
June 22	R. E. Horton	462	5.20	86	......	139
July 23	E. C. Niles	360	*c*5.68	79	......	142
Aug. 20	E. F. Weeks, R. Shelley	462	5.60	80	......	172
Oct. 25	E. C. Niles	360	5.32	93	......	136
Oct. 26	E. C. Niles	360	5.20	95	......	156
Nov. 5	E. C. Niles	360	5.10	96	......	146
Nov. 15	E. C. Niles, J. L. Quinn	360	5.15	90	......	157
Nov. 16	E. C. Niles	360	5.20	90	......	149

a Water-surface below bridge floor. *c* Below reference point.

Current-meter Discharge Measurements of Erie Canal Feeder at Bellinger St., Little Falls N. Y.

DATE.	Hydrographer.	Gage height.a	Area of section.	Mean velocity.	Dis-charge.
1908.		Feet.	Square feet.	Ft. per second.	Second-feet.
Sept. 13...	A. R. Patchke	5.15	86.6	1.74	151
Oct. 5...	Weeks and Quinn	5.88	75.4	1.53	115

a Below reference point.

Current-meter Discharge Measurements of Whitman's Raceway, Little Falls, N. Y.

DATE.	Hydrographer.	Meter No.	Gage height.	Area of section.	Mean velocity.	Dis-charge.
1905.			Feet.	Square feet.	Ft. per second.	Second-feet
Sept 2..	C. A. Poole	717	c2.20	128	1.99	255
Nov. 14..	C. A. Poole	360	c1.50	156	1.32	206
1907.						
July 23..	E. C. Niles	a360	c2.25	128	......	176
July 23..	E. C. Niles	b360	c9.30	238	......	219
Aug. 20..	Weeks and Shelley	b462	9.30	211	......	255
Nov. 15..	Niles and Quinn	a360	1.85	150	......	174
Nov. 16..	Niles and Quinn	a360	1.90	150	......	168

a Measurement made from bridge near engine room, down-stream, from head-gates.
b Measurement made at head of race. c Below reference point.

Current-meter Discharge Measurements of Whitman's Race, Little Falls, N. Y.

DATE.	Hydrographer.	Gage height.a	Area of section.	Mean velocity.	Dis-charge.
1908.		Feet.	Square feet.	Ft. per second.	Second-feet.
May 14...	Weeks and Clark	2.25	151	2.10	315
Sept. 14...	A. R. Patchke	3.20	130	1.26	164
Oct. 5...	Weeks and Quinn	3.10	135	1.26	170

a Reference point is top of spike in wall, right-hand, down-stream side of bridge across race.

Current-meter Discharge Measurements of Upper Gilbert Mill Race (Old Erie Canal), Little Falls, N. Y.

DATE.	Hydrographer.	Meter No.	Gage height.a	Area of section.	Mean velocity.	Dis-charge.
1907.			Feet.	Square feet.	Ft. per second.	Second-feet.
July 23..	E. C. Niles	360	5.75	55	......	234
Aug. 20..	Weeks and Shelley	462	5.85	56	......	113
Oct. 25..	E. C. Niles	360	5.65	58	......	252
Nov. 5..	E. C. Niles	360	4.35	74	......	262
Nov. 15..	Niles and Quinn	360	4.95	70	......	205
Nov. 16..	Niles and Quinn	360	5.00	70	......	212

a Reference point is top of wall, right-hand, down-stream side of bridge across race at Lock street.

Current-meter Discharge Measurements of Upper Gilbert Mill Race (Old Erie Canal) Little Falls, N. Y.

DATE.	Hydrographer.	Gage height.a	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
May 14...	Weeks and Clark....................	4.40	79.7	2.66	212
Sept. 14...	A. R. Patchke........................	6.50	42.9	4.71	202
Oct., 5...	Weeks and Quinn....................	6.02	53.7	3.56	191

a Reference point is top of wall, right-hand, down-stream side of bridge across race at Lock street.

ERIE CANAL NEAR LITTLE FALLS, N. Y.

Current-meter measurements of the flow in Erie canal at the first bridge west of Little Falls were made during 1908, as shown in the accompanying table.

Current-meter Discharge Measurements of Flow in Erie Canal at First Bridge West of City Limits, Little Falls, N. Y.

DATE.	Hydrographer.	Gage height.a	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Sept. 12b.	A. R. Patchke........................	4.80	479	0.126	60.3
Oct. 5b..	Weeks and Quinn....................	5.05	462	0.273	126

a Below reference point. b Initial point is at face of left-hand, down-stream abutment. Reference point is the top of lower step of down-stream, right-hand abutment.

MOHAWK RIVER NEAR HERKIMER, N. Y.

This gaging station, which is located at the highway bridge over the Mohawk river between Herkimer and Mohawk, was established November 23, 1904, by C. A. Poole for this Department. The gage is a vertical board secured to the left-hand, or north abutment of the bridge. The gage is in two sections reading from zero to 3.4 feet and from 3.4 to 15.0 feet, respectively. It is graduated in feet and tenths and the elevation of zero is 377.43. Observations of the state of the stream are taken twice each day by Henry Edick, Jr.

Preceding the fall of 1908 current-meter measurements were made from the down-stream side of the bridge. Later measurements have been made from the up-stream side of the bridge, which has a single span of 124.3 feet. The river channel is of uniform cross-section and straight for several hundred feet below

the bridge. About 200 feet above the bridge there is a slight bend to the south. During extreme high water the river overflows its banks and flows through additional openings in the dike formed by the highway, and it is necessary to measure this additional flow in order to get the total flood discharge at this station.

This gaging station is located about one and one-quarter miles above the junction of the Mohawk river and West Canada creek. The drainage area of West Canada creek, above its junction with the Mohawk river, is 583 square miles and the drainage area of the Mohawk, above the same point, is about 712 square miles.

The stream channel is obstructed by aquatic grass during the summer months, so that there is not a constant relation between gage height and discharge.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Herkimer, N. Y

DAY.
1908.
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Current-meter Discharge Measurements of Mohawk River at Herkimer, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908.					
April 20...	E. C. Niles	4.30	849	3.35	2,845
May 13...	Weeks and Clark	2.20	590	2.18	1,285
May 27...	A. T. Clark	2.60	638	2.51	1,600
June 10...	Newton and Patchke	1.40	574	1.34	770
June 18...	E. F. Weeks	1.20	539	1.04	559
July 2...	A. T. Clark	1.20	536	0.642	*a*344
July 17...	E. C. Niles	1.80	646	0.501	*a*324
Aug. 27...	A. R. Patchke	1.72	589	0.289	*a*170
Sept. 3...	Niles and Overocker	1.85	600	0.410	*a*246
Sept. 9...	Niles and Overocker	1.80	594	0.398	*a*237
Sept. 10...	A. R. Patchke	1.80	591	0.315	*a*186
Sept. 21...	Overocker and Quinn	1.60	576	0.274	*a*158
Oct. 2...	Weeks and Quinn	1.75	590	0.503	*a*297

a Grass obstruction.

WEST CANADA CREEK DRAINAGE BASIN.

DESCRIPTION OF BASIN.

West Canada creek rises in West Canada lakes, in southwest-central Hamilton county, and flows southwestward, then southeastward into the Mohawk at Herkimer, N. Y.

The drainage area is shown on the Utica, Little Falls, Remsen, Wilmurt, Old Forge and Canada lakes quadrangles, U. S. Geological Survey topographic map.

There are about fifty small lakes and a few undrained ponds in the watershed of the stream. Most of these are situated near the head waters and above the gaging station, the largest single water-surface being Honnedaga lake, 1.4 square miles in extent. There is also a small amount of controllable storage, in reservoirs formed by three dams. Swamps and marshes are numerous in the region of the head waters, usually adjoining lakes and tributaries and having an extent of one-half square mile or less each.

Much of the region above Twin Rock is timber-covered. There are extensive sand areas in the central and upper drainage basins. The soil of the upper watershed is underlaid by granitic gneiss usually at or near the surface, excepting in alluvial valleys. From a point just above Twin Rock bridge and extending down-stream beyond Trenton Falls, the underlying geological formation is Trenton limestone.

Compacted snow accumulates in the woodlands in winter, often to a depth of three or four feet, and representing an inch of water for each five or six inches of snow. This melts slowly, feeding

the stream in March and April, which months may show a run-off greatly exceeding the precipitation.

In order to determine the precipitation on the drainage basin of upper West Canada creek, three rainfall and snow-gage stations were established in the fall of 1905. The gages were erected by Daniel L. Mott. The observers are as follows:

Hoffmeister's.— Mrs. Augustus H. Hoffmeister.

North Lake.— George C. Paull.

Honnedaga.— A. D. Barber. (Abandoned.)

Twin Rock.— Frank McArthur. (Established in 1908.)

Trenton Falls.— C. W. Young. (Established in 1908.)

The results of gagings at a station formerly maintained on this stream at Middleville are given in the report of the State Engineer and Surveyor for 1902, supplement, pages 145–149.

Drainage Area of West Canada Creek. a

DIVISIONS OF AREA	AREA IN SQUARE MILES.		
	Place to place.	Sub-total.	Total.
West Canada creek lakes, source to outlet of Mud lake	18.05	......	18.05
West Canada creek, foot of lakes to Swanson dam	28.77	......	46.8
West Canada creek, Swanson dam to ¼ mile below Metcalf brook	46.82	......	93.
Honnedaga lake, above outlet	5.40	5.40	....
Honnedaga brook, foot of lake to mouth	11.9	17.30	....
Honnedaga lake and brook, total, source to mouth	......	17.30	110.94
West Canada creek, Honnedaga lake outlet to junction with south branch (Nobleboro)	30.46	......	141.40
South branch, West Canada creek, above Mountain House (Remonda)	34.40	34.40	....
South branch, West Canada creek, Mountain House to mouth at Nobleboro	19.25	53.65	....
South branch, West Canada creek, total, source to mouth	......	53.65	....
West Canada creek, total to Nobleboro, including south branch	......	......	195.0
West Canada creek, Nobleboro (junction n. and s. branches) to Wilmurt	2.58	......	....
West Canada creek, total above bridge at Wilmurt	......	......	197.63
Fourmile brook, total, source to mouth	......	26.17	....
West Canada creek, total at Wilmurt, including Fourmile brook	......	......	223.80
West Canada creek, Wilmurt to mouth of Black creek	36.92	......	....
West Canada creek, total to mouth of black creek	......	......	260.72
Black creek, source through Hall Vly	8.4	8.4	....
Black creek, Hall Vly to Bennett's mill (first bridge above Gray)	16.3	24.7	....
Black creek, Bennett's mill to Gray	4.5	29.2	....
Black creek, Gray to first bridge below Gray	3.0	32.20	....
Mill creek, source through Cranberry lake and swamp	11.0	......	....
Mill creek, foot of Cranberry lake to junction N. branch	6.2	17.20	....
Mill creek, total, source to mouth	......	17.20	....
North branch, Black creek, above contour 1,520 (Bull Hill road)	6.8	......	....
North branch, Black creek, Bull Hill road to junction Mill creek	4.0	10.8	....
North branch, Black creek, junction, Mill creek to mouth	0.85	11.65	....
North branch, Black creek, total to junction with Black creek	......	20.85	....
Black creek, total to first bridge below Gray	......	61.05	....
Black creek, first bridge below Gray to Mounts creek	0.17	61.22	....
Mounts creek, above Gray-Wilmurt road (Radley)	13.25	......	....
Mounts creek, Radley to mouth	2.10	......	....
Mounts creek, total, source to mouth	......	15.35	....
Black creek, mouth of Mounts creek to second bridge below Gray	1.55	......	....
Black creek, total to second bridge below Gray	......	78.12	....
Black creek, second bridge below Gray to third bridge	5.65	83.77	....
Black creek, third bridge below Gray to fourth bridge	12.35	96.12	....

Drainage Area of West Canada Creek — (Concluded). a

DIVISIONS OF AREA.	AREA IN SQUARE MILES.		
	Place to place.	Sub-total.	Total.
Black creek, fourth bridge below Gray to fifth bridge (Pardeville)	4.0	100.12	......
Black creek, Pardeville to Grant	1.95	102.07	......
Black creek, Grant to mouth	1.15	103.22	......
Black creek, total, source to mouth	.....	103.22	......
West Canada creek, total to mouth of and including Black creek	.....	......	363.94
West Canada creek mouth of Black creek to Twin Rock bridge	0.5	......	......
West Canada creek, total to Twin Rock bridge	.....	......	364.44
West Canada creek, Twin Rock bridge to Hinckley dam	8.5	......	372.94
West Canada creek, Hinckley dam to Prospect	2.0	......	374.94
West Canada creek, Prospect to Trenton Falls	0.9	......	375.84
West Canada creek, Trenton Falls to Steuben creek	6.2	......	382.04
Steuben creek, total, source to mouth	52.3	......	434.34
West Canada creek, Steuben creek to Poland (first bridge below)	35.8	......	470.14
West Canada creek, Poland to Newport	10.0	......	480.14
West Canada creek, Newport to Middleville	47.2	......	527.34
West Canada creek, Middleville to Kast Bridge	47.5	......	574.84
West Canada creek, Kast Bridge to mouth	8.8	......	583.64
West Canada creek, total, source to mouth	......	......	583.64

a Taken from U. S. Geological Survey topographic maps.

WEST CANADA CREEK AT KAST BRIDGE, N. Y.

This gaging station, which is located on West Canada creek about four miles from its junction with the Mohawk river, was established May 15, 1905, by Robert E. Horton, hydrographer, U. S. Geological Survey. The station has since been maintained by this Department.

The gage is of the weight-and-reel type and is placed in a box secured to the north railing of bridge at first panel point from east abutment. The readings are taken by measuring down from a scale in the box to the water-surface by means of an iron weight suspended by graduated tape, which is attached to the reel. The scale in box is one foot long, graduated to tenths and hundredths, with its zero at elevation 464.04. The end of weight used to locate the water-surface is 49.80 feet from zero of tape, which is graduated to feet. The elevation of bottom of weight, when zero of tape is opposite zero of scale, is, therefore, 414.24. The elevation of bench-mark on north end of bridge-seat of right-hand abutbent is 458.02.

Observations are taken twice daily by Lloyd Kast.

Discharge measurements are made from the down-stream side of the bridge, to which the gage tape is attached. The initial point

for soundings is the top face of the left abutment, down-stream side. The drainage area at this point is 574 square miles, or 58 per cent greater than at Twin Rock bridge.

This portion of the basin is underlain by Hudson river and Trenton shales. The topography is moderately rolling. The soil is ordinarily rather impervious and usually under culture. The precipitation and snow storage are considerably less than in the upper part of the drainage area.

Current-meter Discharge Measurements of West Canada Creek at Kast Bridge, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Dis-charge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
April 18...	Niles and Clark	30.52	721	4.29	3,093
May 13...	Weeks and Clark	29.82	584	3.06	1,785
May 28...	A. T. Clark	29.63	561	2.96	1,664
June 18...	E. F. Weeks	28.52	332	1.46	484
July 17...	E. C. Niles	28.30	306	1.25	382
July 22...	Clark and Quinn	29.68	562	2.64	1,485
Aug. 6...	Weeks and Jones	28.60	352	1.51	532
Aug. 20...	Weeks and Clark	28.56	348	1.56	544
Sept. 9...	Overocker and Niles	28.26	296	1.16	345
Sept. 13...	D. W. Overocker	28.25	294	1.16	341
Sept. 21...	Overocker and Quinn	28.02	255	9.02	230
Oct. 2...	Weeks and Quinn	28.40	319	1.31	419
Oct. 20...	E. C. Niles	28.15	277	1.13	312

Mean Daily Elevation of Water-surface (Barge Canal Datum) of West Canada Creek at Kast Bridge, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	444.74	442.75	442.95	445.52	446.78	444.70	442.50	442.40	442.38	442.75	442.62	443.21
2	444.22	442.82	443.26	445.16	446.59	443.90	442.36	442.24	442.34	442.70	442.48	443.20
3	443.90	*a*	443.76	444.48	445.78	443.82	442.36	442.28	442.32	442.41	442.50	443.03
4	443.61	*a*	443.62	444.03	445.22	443.65	442.30	442.50	442.26	442.44	442.34	442.84
5	443.09	*a*	443.44	443.87	444.77	443.39	442.68	442.42	442.26	442.42	442.36	442.96
6	443.20	*a*	443.13	445.23	444.82	443.19	442.57	442.80	442.22	442.40	442.34	442.64
7	443.24	*a*	443.30	444.92	445.25	443.05	442.43	443.08	442.28	442.41	442.43	442.89
8	443.40	*a*	443.20	445.88	445.70	442.97	442.96	442.74	442.45	442.29	442.71	443.56
9	443.49	*a*	443.22	446.40	445.50	443.15	443.35	442.72	442.40	442.22	442.51	443.76
10	443.24	*a*	443.12	445.87	445.06	442.94	442.97	442.66	442.35	442.32	442.66	443.31
11	443.12	*a*	442.97	445.68	444.54	442.81	442.68	442.48	442.25	442.66	442.72	443.14
12	443.58	*a*	443.54	445.52	444.40	442.74	442.50	442.42	442.39	443.00	443.58	443.34
13	444.22	*a*	443.88	445.30	444.21	442.69	442.56	442.47	442.42	442.84	443.46	443.63
14	443.87	*a*	444.54	444.64	444.58	442.62	442.32	442.48	442.10	442.66	443.13	443.56
15	443.50	446.45	444.97	445.20	444.72	442.70	442.30	442.40	442.24	442.61	442.98	443.34
16	443.48	448.46	445.34	445.24	444.26	442.87	442.50	442.40	442.36	442.44	442.85	443.44
17	443.08	446.92	444.96	444.84	444.54	442.90	442.51	442.86	442.06	442.50	442.72	443.34
18	443.15	445.94	444.62	444.68	443.75	442.72	443.97	443.28	442.30	442.48	442.80	443.01
19	443.05	445.38	444.40	445.37	443.76	443.36	444.97	443.01	442.28	443.05	442.72	443.10
20	442.96	444.75	444.08	445.29	443.71	443.11	444.02	442.76	442.30	442.28	442.88	443.01
21	443.12	444.42	443.85	444.74	443.40	443.43	443.38	442.57	442.12	442.26	443.12	443.03
22	443.32	444.21	443.88	444.50	443.60	442.98	443.48	442.55	442.08	442.32	443.07	442.95
23	443.26	443.81	444.19	444.32	444.26	442.78	443.32	442.48	442.16	442.22	443.14	442.76
24	443.12	443.51	445.00	445.50	444.16	442.69	443.09	442.24	442.06	442.36	443.22	442.80
25	442.93	443.30	444.72	446.54	443.61	442.84	442.92	442.42	442.04	442.40	443.59	442.98
26	443.04	443.48	444.80	446.54	444.12	442.66	443.16	442.40	442.10	441.99	444.26	442.98
27	443.10	443.38	445.60	446.88	444.57	442.71	442.96	442.34	442.15	442.52	444.30	442.95
28	442.97	443.33	446.32	446.94	443.96	442.55	442.83	442.36	441.90	442.48	444.05	442.88
29	442.97	443.02	447.14	446.56	443.58	442.56	442.64	442.32	442.90	442.88	443.50	442.83
30	442.90	......	446.14	445.38	443.66	442.52	442.56	442.38	443.09	443.04	443.31	442.76
31	442.84	......	445.56	......	444.04	......	442.40	442.16	......	442.84	......	442.98

a Ice obstruction, no record.

Mean Daily Discharge, Second-feet, of West Canada Creek at Kast Bridge, N. Y.

DAY.	aJan.	aFeb.	March	April.	May	June.	July.	A[illegible]	[illegible]	[illegible]t.	Nov.	Dec.
1908.												
1			628	5,020	9,368	2,878	241			70	418	818
2			868	3,975	8,665	1,595	209			56	351	811
3			1,385	2,510	5,770	1,455	295			19	361	667
4			1,222	1,770	4,091	1,248	271			38	285	548
5			1,044	1,525	3,029	993	446			23	295	636
6			760	4,150	3,147	804	304			14	285	428
7			891	3,383	4,150	701	328			19	328	564
8			811	6,110	5,528	842	636			02	461	1,173
9			833	8,080	4,875	774	942			34	366	1,385
10			752	6,025	3,737	821	643			30	437	908
11			643	5,455	2,662	526	451			37	465	767
12			1,146	5,020	2,326	475	356			65	1,189	942
13			1,560	4,295	2,015	451	390			61	1,070	1,235
14			2,602	2,796	2,694	427	276			37	780	1,173
15			3,560	4,032	2,924	456	267			[illegible]	651	942
16			4,440	4,150	2,050	570	356			33	555	1,044
17			3,501	3,206	2,602	599	366			61	465	942
18			2,740	2,878	1,350	465	1,665			47	526	672
19			2,326	4,512	1,785	966	3,501			76	465	737
20			1,840	4,295	1,324	745	1,725			02	577	672
21			1,490	2,970	993	1,044	993			48	752	667
22			1,560	2,510	1,197	651	1,805			76	716	628
23			1,990	2,188	2,050	511	916			30	767	490
24			3,560	4,875	1,945	451	730			95	826	518
25			2,924	8,470	1,222	548	606			19	1,197	651
26			3,088	8,470	1,910	442	789			58	2,096	651
27			5,165	9,955	2,648	461	636			70	2,157	628
28			7,592	10,190	1,665	285	548			56	1,788	577
29			11,130	8,762	1,197	395	428			77	1,105	541
30			6,960	4,585	1,274	370	390			94	908	490
31			5,020		1,770		314			48		651
Mean	...	...	2,710	4,872	2,954	755	714			67	754	762

a Ice obstruction.

Monthly Discharge of West Canada Creek at Kast Bridge, N. Y.
[Drainage area, 574 square miles.]

MONTH	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January a	...	...	...	...	...
February a	...	...	...	...	...
March	11,130	628	2,710	4.72	5.43
April	10,190	1,525	4,872	8.48	9.50
May	9,468	993	2,954	5.14	5.91
June	2,878	370	755	1.31	1.47
July	3,501	267	714	1.24	1.43
August	891	211	392	0.682	0.784
September	730	133	271	0.472	0.529
October	694	156	367	0.639	0.735
November	2,157	285	754	1.31	1.47
December	1,385	428	762	1.33	1.53

a Ice obstruction

WEST CANADA CREEK AT POLAND, N. Y.

A gaging station was established by this Department on West Canada creek at the first highway bridge below the village of Poland, N. Y., July 3, 1908. The gage is of the weight-and-chain variety, contained in a box of standard form, which is fastened to the hand-railing of the down-stream side of the bridge near the left-hand end. Length of chain from end of weight to copper rivet marker is 22.65 feet. The gage is read each morning and night by Harrison Fisher. Current-meter measurements obtained during 1908 established a consistent rating curve for low stages of the stream. The accompanying discharge tables have been deduced by the use of this curve. These results are believed to be substantially correct, but may be revised upon completion of the rating curve of a wider range of stages.

The drainage area at point of gaging is 470 square miles.

Current-meter Discharge Measurements of West Canada Creek at Poland, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908.					
July 2...	Clark and Patchke	3.48	331	0.961	318
July 11...	J. P. Newton	3.73	434	1.09	471
July 16...	E. C. Niles	3.50	366	0.91	333
July 22...	Clark and Quinn	4.64	575	1.85	1,065
Aug. 21...	Weeks and Clark	3.51	376	0.95	357
Aug. 28...	A. R. Patchke	3.00	292	0.456	133
Sept. 9...	Niles and Overocker	3.45	365	0.924	337
Sept. 15...	D. W. Overocker	3.25	335	0.681	228
Sept. 23...	Overocker and Quinn	3.00	297	0.478	142
Oct. 3...	Weeks and Quinn	3.12	313	0.616	193
Oct. 20...	E. C. Niles	3.50	370	0.951	352

Mean Daily Gage Height, in Feet, of West Canada Creek at Poland, N. Y.

DAY.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.						
1	......	3.25	3.15	3.95	3.60	4.20
2	......	3.15	3.30	3.35	3.45	4.20
3	3.50	3.40	3.15	3.20	3.35	4.05
4	3.40	3.35	3.20	3.10	3.15	3.90
5	3.75	3.40	3.25	3.25	3.20	3.75
6	3.60	3.80	3.30	3.25	3.20	3.55
7	3.45	3.90	3.50	3.10	3.25	3.45
8	3.80	3.55	3.55	3.15	3.30	3.50
9	4.25	3.55	3.30	3.20	3.35	3.80
10	3.90	3.50	3.35	3.35	3.45	4.45
11	3.75	3.50	3.30	3.50	3.65	4.35
12	3.60	3.50	3.20	3.40	3.95	4.30
13	3.55	3.35	3.20	3.50	4.35	4.80
14	3.45	3.50	3.20	3.55	3.90	4.25
15	3.40	3.35	3.25	3.45	3.70	4.10
16	3.50	3.20	3.20	3.45	3.75	4.15
17	3.65	3.30	3.15	3.35	3.80	4.00
18	5.35	3.95	3.20	3.30	3.70	3.95
19	6.30	3.95	3.15	3.40	3.45	3.85
20	5.00	3.85	3.15	3.25	3.80	3.75
21	4.40	3.55	2.95	3.10	4.00	3.85
22	4.65	3.45	2.95	3.15	3.95	3.90
23	4.35	3.30	3.05	3.10	3.85	3.80
24	4.00	3.45	3.05	3.05	3.95	3.65
25	3.75	3.25	3.10	3.30	4.75	3.60
26	3.45	3.20	3.10	3.20	5.40	3.75
27	3.15	3.15	3.00	3.10	5.65	3.90
28	3.00	3.30	3.05	3.20	5.10	3.85
29	3.15	3.25	3.60	3.70	4.50	3.85
30	3.50	3.00	4.05	3.85	4.20	3.80
31	3.45	3.25	......	3.70	......	3.60

Mean Daily Discharge, Second-feet, of West Canada Creek at Poland, N. Y.

DAY.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.						
1	......	240	200	592	405	748
2	......	200	263	286	332	748
3	355	309	200	220	286	652
4	309	286	220	180	200	564
5	480	309	240	240	220	480
6	405	508	263	240	220	380
7	332	564	355	180	240	332
8	508	380	380	200	263	355
9	780	380	263	220	286	508
10	564	355	286	286	332	916
11	480	355	263	355	430	848
12	405	355	220	309	592	814
13	380	286	220	355	848	1,202
14	332	355	220	380	564	780
15	309	286	240	332	455	684
16	355	220	220	332	480	712
17	430	263	200	286	508	620
18	1,790	592	220	263	455	592
19	3,235	592	200	309	332	536
20	1,390	536	200	240	508	480
21	882	380	127	180	620	536
22	1,073	332	127	200	592	564
23	848	263	160	180	536	508
24	620	332	160	160	592	430
25	480	240	180	263	1,155	405
26	332	220	180	220	1,855	480
27	200	200	140	180	3,206	564
28	140	263	160	220	1,498	536
29	200	240	405	455	950	536
30	355	140	652	536	748	508
31	332	240	......	455	......	405
Mean	631	330	239	286	657	594

Monthly Discharge of West Canada Creek at Poland, N. Y.
[Drainage area, 470 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.				RUN-OFF.
	Maximum.	Minimum.	Mean.	Per square mile.	Depth in inches on drainage area.
1908.					
July	3,235	140	631	1.34	1.54
August	592	140	330	0.702	0.807
September	652	127	239	0.509	0.570
October	592	160	286	0.609	0.700
November	3,206	200	657	1.39	1.56
December	1,202	332	594	1.26	0.145

WEST CANADA CREEK ABOVE MORGAN DAM, TRENTON FALLS, N. Y.

A gage was established February 8, 1904, by E. A. Lamb on the right-hand bank of West Canada creek about 100 feet up-stream from Morgan dam. The gage is attached to a large cedar tree and consists of a vertical board with painted tenth-foot stripes and reads from zero to 14 feet. The gage is located about 1,200 feet down-stream from the power-plant of the Utica Gas & Electric Co., at Trenton Falls. Its zero mark is at elevation 751.03. Readings are taken each morning and night by C. W. Young. The gage is maintained by this Department in coöperation with the U. S. Weather Bureau.

Mean Daily Elevation of Water-surface (U. S. Weather Bureau Datum) of West Canada Creek above Morgan Dam at Trenton Falls, N. Y. a

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	754.83	753.43	753.63	755.08	755.53	754.83	753.23	753.23	753.13	753.43	753.33	753.83
2	754.63	753.43	753.68	754.98	755.28	754.73	753.23	753.23	753.13	753.23	753.28	753.78
3	754.38	753.43	753.88	754.43	754.93	754.33	753.23	753.18	753.13	753.13	753.23	753.53
4	754.08	753.38	753.83	754.13	755.23	754.03	753.23	753.13	753.13	753.13	753.23	753.43
5	753.93	753.33	753.73	754.18	754.93	753.88	753.33	753.13	753.13	753.13	753.23	753.43
6	753.83	753.33	753.63	754.68	755.23	753.83	753.33	753.48	753.18	753.13	753.23	753.43
7	753.83	753.33	753.63	754.93	754.93	753.53	753.23	753.48	753.28	753.13	753.23	753.48
8	753.93	753.23	753.63	755.13	755.88	753.78	753.88	753.43	753.13	753.13	753.23	754.13
9	753.93	753.33	753.63	756.03	755.63	753.48	753.73	753.23	753.13	753.13	753.43	754.08
10	753.78	753.43	753.63	755.78	755.08	753.38	753.58	753.23	753.13	753.13	753.43	753.83
11	753.73	753.58	753.53	755.68	754.83	753.33	753.38	753.23	753.23	753.23	753.48	753.73
12	753.78	753.53	753.58	755.73	754.68	753.33	753.33	753.18	753.23	753.78	754.38	753.73
13	754.03	753.63	753.68	755.38	755.33	753.33	753.33	753.13	753.13	753.43	754.13	754.43
14	754.03	753.63	754.03	754.93	755.13	753.23	753.23	753.23	753.13	753.33	753.68	753.78
15	753.98	754.33	754.33	755.03	755.13	753.43	753.23	753.33	753.13	753.33	753.53	753.53
16	753.93	757.58	754.93	755.33	754.58	753.53	753.23	753.23	753.13	753.33	753.53	753.43
17	753.83	756.63	754.93	755.03	754.38	753.43	753.23	753.23	753.13	753.28	753.48	753.43
18	753.83	755.88	754.88	754.88	754.58	753.23	754.38	753.48	753.13	753.03	753.33	753.43
19	753.73	755.43	754.68	755.43	754.68	753.23	755.13	753.33	753.23	753.33	753.38	753.43
20	753.73	754.98	754.48	755.43	754.28	754.03	754.23	753.23	753.13	753.23	753.53	753.43
21	753.63	754.73	754.33	755.03	753.98	753.98	753.93	753.23	753.13	753.23	753.53	753.43
22	753.73	754.48	754.13	754.73	754.18	753.78	753.78	753.23	753.13	753.23	753.43	753.33
23	753.73	754.38	754.13	754.73	754.78	753.58	753.73	753.13	753.13	753.23	753.58	753.33
24	753.63	754.08	754.23	754.93	754.13	753.33	753.68	753.13	753.13	753.13	753.68	753.33
25	753.53	754.03	754.33	756.53	754.53	753.33	753.53	753.13	753.13	753.13	754.03	753.33
26	753.53	754.03	754.43	756.53	754.33	753.33	753.78	753.13	753.13	753.13	754.68	753.38
27	753.53	754.03	754.88	756.88	754.63	753.33	753.63	753.13	753.13	753.13	754.73	753.38
28	753.63	753.78	755.63	756.88	754.28	753.23	753.53	753.13	753.13	753.13	754.43	753.33
29	753.63	753.63	756.58	756.33	754.03	753.23	753.38	753.13	753.83	753.68	754.13	753.33
30	753.53	......	756.03	755.73	754.33	753.23	753.28	753.13	753.73	753.68	753.78	753.33
31	753.48	......	755.63	......	754.53	......	753.23	753.13	......	753.58	......	753.33

a Below Trenton Falls power plant.

WEST CANADA CREEK AT TRENTON FALLS, N. Y.

This gaging station, which is located at the dam of the Utica Gas and Electric Co., was established October 17, 1905, by C. A. Poole. The gage board is secured to face of dam in a vertical position and is placed above the water-surface, the readings being taken by means of chain and plumb-bob passing on pulley over top of gage. The observations are taken by placing plumb-bob at water-surface and reading the gage at a point marked on chain ten feet above plumb-bob. The elevation of zero of gage is 1,009.56, to which all readings are added. The gage is graduated in feet and inches and is read twice each day by C. W. Young.

The dam is of concrete with masonry coping and has a spillway 97.9 feet long. Another spillway or by-pass two feet lower than crest or main spillway allows the water to pass through a rock channel on east side of dam. The crest of this lower spillway is 163.4 feet long at an elevation of 1,017.12. The discharge over the two spillways has been calculated by means of the weir formula, using coëfficients derived from the United States Geological Survey experiments.

The discharge diverted by the Power Company has been computed from diagrams expressing the flow as a function of the kilowatts used. These diagrams were made from tests made by the Power Company to determine the discharging capacity of the turbines, which are of a special design. These tests were made by computing the discharge over weirs placed in the tail-race.

A daily record is kept of the total kilowatts used in twenty-four hours, also the number of hours every day each turbine runs, there being four turbines in all.

The mean discharge has been calculated from each observation taken at the gage, thereby giving a mean for twelve hours, and the maximum and minimum discharges given in the accompanying table are, therefore, means for twelve hours and do not represent the highest or lowest flow of short duration.

The pondage above the Trenton Falls dam is very limited and the operation of the generators during low water has to be adjusted according to the conditions of inflow. The inflow is controlled by pondage above Hinckley dam. Owing to irregularity of operation during low water, the Trenton Falls record is considered approximate only, for the low-water period.

A rain gage was established at Trenton Falls, August 6, 1908. The recorded daily precipitation is shown in the accompanying table.

Owing to the drawing down of the pond above the Trenton Falls dam, the average elevation of the water-surface in the pond is deduced from two tail-race readings, roughly approximate only. The pond level fluctuates often as much as 10 feet during 24 hours in the low-water season. In connection with the calculated discharge at Trenton Falls it may be stated that there are a variety of conditions which tend to make the results of calculations of discharge for that station somewhat too small, especially during low-water periods.

The drainage area at the point of gaging is 375.8 square miles.

Mean Daily Precipitation at Trenton Falls, N. Y.

DAY.	July.	Aug.	Sept.	Oct.	Nov.
1908.					
1	......	......	......	......	......
2	......	......	.05	......	......
3	......	......	.15	.22	......
4	......	......	......	......	.12
5	......	.02	......	......	......
6	1.34	.78	......	......	.06
7	......	.05	.44	......	.38
8	.54	......	......	......	......
9	......	.26	......	......	.13
10	......	......	......	......	......
11	......	......	......	.69	.23
12	......	......	......	.02	.48
13	.24	.15	......	......	.13
14	......	.01	......	......	......
15	.01	......	......	......	.41
16	......	......	......	......	T
17	......	......	......	......	.23
18	2.10	1.13	......	......	.11
19	.25	.40	......	......	.02
20	......	.05	......	......	.18
21	......	......	......	......	......
22	.55	......	......	......	......
23	......	.06	.02	......	......
24	......	......	......	......	......
25	.24	......	......	.06	......
26	.21	......	......	.02	.03
27	......	......	......	.13	.02
28	......	......	......	.11	.04
29	......	......	1.37	.58	......
30	......	......	......	......	......
31	......	......	......	......	......
Monthly total	5.48	2.91	2.03	1.83	2.57

T means trace.

Mean Daily Elevation of Water-surface (U. S. Weather Bureau Datum) of West Canada Creek above Power Co.'s Dam, Trenton Falls, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1,020.35	1,017.98	1,018.23	1,019.52	1,021.89	1,019.44	1,012.64	1,014.68	1,012.06	1,013.27	1,017.27	1,017.77
2	1,019.94	1,019.77	1,018.27	1,019.44	1,021.10	1,019.31	1,017.14	1,017.23	1,012.73	1,012.14	1,013.23	1,017.73
3	1,019.64	1,017.81	1,018.85	1,019.10	1,020.35	1,018.27	1,016.06	1,013.85	1,010.23	1,014.18	1,009.60	1,017.14
4	1,019.35	1,018.27	1,018.77	1,018.68	1,019.94	1,018.31	1,017.56	1,013.85	1,014.48	1,018.06	1,013.73	1,017.10
5	1,019.56	1,018.69	1,018.60	1,019.18	1,019.60	1,018.18	1,017.81	1,014.77	1,016.81	1,010.98	1,013.23	1,017.31
6	1,018.89	1,018.48	1,018.68	1,019.10	1,019.81	1,018.10	1,014.52	1,017.73	....	1,010.98	1,016.39	1,017.56
7	1,019.02	1,017.94	1,018.68	1,019.35	1,019.48	1,018.10	1,013.44	1,017.64	1,016.85	1,008.56	1,015.81	1,017.23
8	1,019.35	1,017.68	1,019.18	1,019.81	1,020.73	1,017.85	1,018.14	1,017.64	1,015.31	1,009.35	1,017.27	1,018.10
9	1,019.35	1,019.56	1,018.94	1,021.14	1,020.35	1,017.52	1,017.98	1,017.64	1,012.89	1,006.48	1,015.39	1,018.14
10	1,019.02	1,018.14	1,017.64	1,020.48	1,019.85	1,017.52	1,017.64	1,013.89	1,008.10	1,011.56	1,012.10	1,017.81
11	1,018.87	1,018.18	1,017.73	1,020.35	1,019.35	1,017.39	1,017.48	1,014.35	1,014.52	1,012.94	1,017.27	1,017.73
12	1,019.81	1,018.27	1,017.89	1,020.48	1,019.10	1,017.31	1,017.48	1,012.18	1,014.06	1,017.81	1,018.48	1,017.73
13	1,019.56	1,018.56	1,017.98	1,019.94	1,019.60	1,017.23	1,012.06	1,014.98	....	1,017.18	1,017.94	1,019.02
14	1,019.36	1,019.02	1,018.27	1,019.52	1,019.48	1,017.31	1,009.48	1,014.81	1,011.44	1,013.48	1,017.60	1,017.85
15	1,018.98	1,019.98	1,018.89	1,019.64	1,019.85	1,017.06	1,016.48	1,014.73	1,012.54	1,010.27	1,017.64	1,017.64
16	1,018.94	1,023.18	1,019.48	1,020.06	1,018.81	1,017.60	1,017.06	1,013.89	1,012.64	1,012.44	1,016.98	1,017.56
17	1,018.44	1,021.56	1,019.48	1,019.56	1,018.73	1,017.39	1,014.48	1,017.02	1,011.06	1,012.85	1,014.10	1,017.44
18	1,018.89	1,020.39	1,019.31	1,019.44	1,018.98	1,015.68	1,018.68	1,019.60	1,007.81	1,001.48	1,013.94	1,017.44
19	1,019.31	1,019.73	1,019.02	1,020.06	1,019.23	1,013.48	1,019.81	1,019.23	1,014.06	1,012.35	1,012.02	1,017.35
20	1,018.39	1,019.48	1,018.77	1,019.98	1,018.68	1,018.48	1,018.60	1,018.52	....	1,014.48	1,016.69	1,017.64
21	1,018.56	1,019.10	1,018.44	1,019.56	1,018.39	1,018.73	1,018.02	1,017.06	1,002.56	1,008.98	1,017.56	1,017.39
22	1,018.68	1,018.98	1,018.73	1,019.10	1,018.35	1,017.81	1,018.23	1,014.06	1,014.89	1,012.27	1,017.64	1,015.81
23	1,018.52	1,018.85	1,018.52	1,019.14	1,019.23	1,017.64	1,017.98	1,015.35	1,013.64	1,011.73	1,017.39	1,014.56
24	1,018.44	1,018.23	1,018.52	1,020.56	1,018.52	1,017.52	1,017.64	1,015.85	1,011.94	1,009.94	1,017.39	1,014.39
25	1,017.85	1,018.02	1,018.89	1,021.48	1,019.02	1,017.60	1,017.53	1,009.98	1,014.06	1,005.73	1,018.19	1,017.94
26	1,019.31	1,018.10	1,018.85	1,021.35	1,018.77	1,016.89	1,018.06	1,015.06	1,010.39	1,013.85	1,019.06	1,017.68
27	1,018.81	1,018.12	1,019.44	1,022.02	1,019.02	1,017.31	1,017.81	1,010.60	....	1,006.94	1,018.98	1,017.44
28	1,018.68	1,017.98	1,020.18	1,022.02	1,018.64	1,017.39	1,015.56	1,014.64	1,005.73	1,014.14	1,018.69	1,016.68
29	1,018.98	1,017.89	1,021.64	1,021.52	1,018.27	1,016.77	1,014.98	1,014.73	1,019.60	1,017.44	1,018.48	1,016.48
30	1,018.48	....	1,020.81	1,019.89	1,018.89	1,015.35	1,014.48	1,014.98	1,019.44	1,017.60	1,017.85	1,014.98
31	1,018.14	....	1,020.18	....	1,019.02	....	1,013.52	1,014.56	....	1,017.31	....	1,016.02

Mean Daily Discharge, Second-feet, of West Canada Creek at Trenton Falls, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1,362	215	*709	2,257	7,620	2,160	226	191	125	273	*119	265
2	916	*682	754	2,140	5,453	1,968	227	*131	127	249	265	247
3	622	200	1,403	1,678	*3,608	853	222	225	123	220	196	274
4	390	210	1,285	1,200	2,934	882	246	181	130	*42	155	285
5	*412	263	1,141	*1,655	2,388	782	*383	185	123	189	203	273
6	272	203	1,239	1,687	2,707	698	229	241	*30	176	200	*159
7	268	206	1,219	2,014	2,195	*572	222	489	133	154	201	259
8	390	193	*1,704	2,725	4,567	552	776	415	197	159	*154	185
9	388	*379	1,511	5,571	3,716	374	660	*288	149	163	262	277
10	263	193	430	4,003	*2,662	376	449	436	153	193	257	289
11	256	211	469	3,729	2,014	332	341	203	214	*89	263	284
12	*656	200	561	*3,876	1,679	306	*216	201	215	561	209	279
13	526	209	632	2,918	2,386	254	264	190	*36	237	219	*136
14	405	209	845	2,250	2,194	*150	222	195	123	264	224	276
15	252	957	*1,350	2,451	2,789	252	224	240	121	235	*114	285
16	261	*11,179	2,206	3,161	1,306	400	225	*106	121	202	273	283
17	260	6,661	2,201	2,321	*1,122	321	223	237	119	216	251	283
18	245	3,870	1,911	2,137	1,534	252	1,198	491	137	*84	259	289
19	*231	2,635	1,558	*3,036	1,841	252	*2,593	309	7	160	269	271
20	290	2,319	1,276	3,021	1,210	978	1,161	245	*	177	263	*137
21	270	1,702	991	2,324	939	*1,116	682	248	118	171	247	277
22	260	1,546	*1,164	1,681	895	498	834	191	121	171	*139	285
23	264	*1,269	1,043	1,728	1,814	397	615	*106	120	151	267	265
24	259	854	1,044	4,175	*970	345	422	204	121	138	267	252
25	266	660	1,452	6,400	1,583	382	333	136	128	*84	247	136
26	*230	738	1,392	*5,985	1,309	259	*556	134	68	179	162	225
27	271	724	2,157	7,897	1,534	286	532	131	*	155	249	*133
28	275	661	3,411	7,891	1,184	*180	258	124	107	196	246	258
29	271	529	*6,826	6,471	840	255	259	127	574	339	*103	265
30	274	.....	4,733	2,865	1,349	261	265	*68	445	386	268	279
31	256	.....	3,431		*1,455	...	215	136	.....	325	.....	246
Mean	373	1,376	1,679	3,374	2,253	556	494	220	149	206	219	247

* Indicates Sundays.

Monthly Discharge of West Canada Creek at Trenton Falls, N. Y.
[Drainage area, 375 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	1,362	230	373	0.996	1.15
February	11,179	193	1,376	3.67	3.96
March	6,826	430	1,679	4.48	5.15
April	7,897	1,200	3,374	9.01	10.09
May	7,620	840	2,253	6.02	6.92
June	2,160	150	556	1.48	1.66
July	2,593	216	494	1.32	1.52
August	491	68	220	0.587	0.675
September	574	7	149	0.398	0.446
October	561	42	206	0.550	0.632
November	273	103	219	0.584	0.654
December	289	133	247	0.659	0.758

West Canada Creek at Twin Rock Bridge.

A current-meter gaging station was established at Twin Rock bridge, September 7, 1900, by Robert E. Horton, for the U. S. Geological Survey, by which it has since been maintained in coöperation with this Department. The bridge is 167.5 feet long between abutments, and consists of two spans. The bed is of

gravel and cobble, and the entire flow passes underneath at all stages. In the winter the stream becomes completely ice-covered, requiring special discharge measurements. The gage is read each morning and evening by Frank McArthur, and the record is furnished by the Consolidated Water Co. of Utica, N. Y.

The readings are taken from a gage of special design equipped with a phosphor-bronze tape, attached to the up-stream side of the bridge. When the stream is obstructed by logs, the discharge is determined from special measurements. During 1908 a series of low-water measurements was made by boat at a cross-section 50 feet up-stream from the bridge.

The gaging section at Twin Rock bridge is affected at times by backwater from logs which are lodged in the stream, beginning near Hinckley mill-dam and extending up-stream nearly to the bridge or sometimes above the bridge. During periods of log obstruction, as also in winter, when the stream is ice-covered and contains more or less needle ice, it is necessary to estimate the discharge from special current-meter measurements and rating curves. The accompanying tables show the actual readings of the gage, but owing to the complicated conditions it is not practical to publish rating tables. It is to be understood that there is not a uniform or constant relation between the gage height and discharge.

The drainage area at point of gaging is 364 square miles.

Current-meter Discharge Measurements of West Canada Creek at Twin Rock Bridge.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Feb. 12a..	Weeks and Patchke	30.57	487	0.591	288
Feb. 14a..	Weeks and Patchke	30.58	507	0.663	336
Feb. 25a..	Clark and Niles	31.96	321	1.83	587
Feb. 27a..	Clark and Niles	32.53	251	2.06	518
April 21...	E. C. Niles	31.55	806	2.86	2,303
May 12...	Clark and Weeks	31.32	765	2.33	1,782
June 17...	Clark and Weeks	29.18	547	0.658	360
July 10...	Horton and Newton	29.91	622	0.714	444
July 16...	E. C. Niles	28.92	500	0.478	239
July 23...	Clark and Quinn	29.94	536	1.000	536
Aug. 21...	Clark and Weeks	28.62	478	0.540	258
Aug. 27...	A. R. Patchke	28.33	265	0.611	162
Sept. 4...	Weeks and Patchke	28.54	458	0.330	151
Sept. 8...	Overocker and Niles	28.35	453	0.404	183
Sept. 14..	D. W. Overocker	28.88	494	0.316	156
Sept. 22...	Overocker and Quinn	28.15	417	0.290	121
Oct. 1...	Weeks and Quinn	29.20	562	0.493	277
Oct. 19...	E. C. Niles	28.56	495	0.473	234

a Under ice cover.

Mean Daily Gage Height, in Feet, of West Canada Creek at Twin Rock Bridge.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug	Sept.	Oct.	Nov.	Dec.
1908.												
1	32.74	30.30	32.41	31.59	36.10	32.08	29.24	28.50	28.22	29.18	28.80	29.50
2	32.58	30.49	32.86	31.42	34.82	32.50	29.22	28.58	28.23	29.00	28.68	29.58
3	33.20	30.55	33.58	31.02	33.54	30.98	29.16	28.44	28.46	28.98	28.41	29.30
4	32.56	30.73	33.63	30.72	32.25	30.56	29.13	28.36	28.56	28.95	28.43	29.22
5	32.56	30.90	33.27	30.54	31.76	30.26	29.47	28.44	28.49	28.63	28.42	29.19
6	32.02	30.88	33.10	30.94	32.23	29.98	29.23	29.86	28.64	28.38	28.44	29.16
7	31.86	30.77	32.90	31.28	31.42	29.48	29.18	29.44	28.66	28.39	28.52	29.26
8	31.92	30.68	32.94	33.05	33.68	29.90	30.54	29.23	28.39	28.40	28.56	30.56
9	31.78	30.66	32.92	34.21	33.22	29.16	30.16	29.20	28.41	28.52	28.74	30.42
10	31.30	30.66	32.41	33.16	32.52	29.26	28.73	28.87	28.70	28.68	28.54	29.93
11	31.04	30.55	32.49	32.98	31.51	29.10	29.48	28.54	28.72	29.62	29.15	29.89
12	31.22	30.58	32.70	33.12	31.34	29.00	29.30	28.45	28.74	29.46	30.48	29.84
13	31.80	30.54	32.92	32.25	32.18	28.87	29.17	28.50	28.84	29.00	29.56	30.03
14	31.50	30.58	33.44	31.42	31.89	28.90	29.08	28.48	28.86	28.62	29.15	29.87
15	30.64	32.21	34.00	31.71	32.68	28.96	29.16	28.46	28.81	28.48	29.06	29.53
16	30.76	40.55	35.31	32.46	31.70	29.42	27.34	28.52	28.75	28.42	28.90	29.50
17	30.35	37.92	34.92	31.60	31.28	29.16	25.70	28.70	28.74	28.40	29.01	29.20
18	30.57	35.83	34.53	31.36	31.07	28.84	28.76	29.56	28.72	28.51	28.71	29.20
19	30.28	34.61	34.04	32.50	31.72	28.65	30.34	29.22	28.19	28.60	28.92	29.11
20	30.01	34.08	33.36	32.34	30.74	30.84	28.25	28.86	28.18	28.46	28.99	29.31
21	30.19	33.23	32.86	31.42	30.12	30.38	27.30	28.58	28.18	28.35	29.28	29.18
22	30.40	32.95	32.68	30.94	30.52	29.70	27.44	28.41	28.16	28.27	29.36	28.92
23	30.44	32.28	32.61	30.98	32.04	29.27	28.86	28.52	28.16	28.28	29.11	28.90
24	30.36	32.12	32.62	33.40	30.74	29.15	30.20	28.50	28.16	28.30	29.04	28.95
25	30.09	32.00	32.95	35.16	31.43	29.34	30.32	28.36	28.16	28.46	30.15	29.52
26	30.55	32.40	32.54	35.04	31.12	29.12	31.06	28.34	28.16	28.58	31.40	29.18
27	30.54	32.52	33.00	35.96	31.74	28.84	30.54	28.29	28.68	28.68	31.46	29.25
28	30.68	32.52	34.34	36.15	30.95	28.94	29.90	28.30	28.66	28.84	31.04	29.21
29	30.80	32.52	37.44	34.74	30.59	29.32	29.57	28.25	29.94	29.28	31.03	29.14
30	30.41	.....	35.12	32.58	31.31	29.32	29.39	28.26	29.50	29.37	29.68	29.04
31	30.34	.....	33.42	.....	31.60	.....	28.98	28.29	.....	28.95	.....	29.13

Mean Daily Discharge, Second-feet, of West Canada Creek at Twin Rock Bridge.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1,975	364	1,054	2,214	8,608	2,884	314	185	140	305	235	360
2	1,870	432	805	1,950	6,684	3,420	305	200	148	270	218	380
3	2,260	449	1,668	1,430	4,870	1,430	296	178	178	270	170	322
4	1,855	509	1,634	1,100	3,085	950	296	162	192	261	176	305
5	1,855	569	1,498	950	2,415	700	350	178	185	209	170	305
6	1,554	560	1,405	1,374	3,085	530	314	455	209	170	178	296
7	1,457	526	1,301	1,820	1,950	360	305	350	209	170	185	314
8	1,498	492	1,327	4,170	5,080	480	950	314	170	170	192	950
9	1,418	483	1,314	5,792	4,380	296	632	305	170	185	226	820
10	1,174	483	1,054	4,310	3,420	314	226	244	218	218	192	505
11	893	398	1,102	4,100	2,080	288	360	192	218	314	296	480
12	970	407	1,198	4,240	1,885	270	322	178	226	350	900	455
13	1,249	398	1,314	3,085	3,018	244	296	185	244	270	370	564
14	1,102	407	1,596	1,950	2,616	253	288	185	244	200	296	455
15	721	959	1,915	2,348	3,692	261	296	178	235	185	279	370
16	761	*	2,751	3,353	2,348	340	†	185	226	170	253	360
17	607	*	2,502	2,214	1,820	296	†	218	226	170	270	305
18	693	3,114	2,240	1,885	1,495	244	†	370	218	185	218	305
19	579	2,320	1,945	3,420	2,348	209	†	305	140	200	253	288
20	483	1,960	1,540	3,219	1,150	1,262	†	244	140	178	270	322
21	432	1,470	1,275	1,950	598	820	†	200	140	162	322	305
22	500	1,327	1,186	1,374	900	405	†	170	135	148	331	253
23	517	934	1,150	1,430	2,816	314	244	185	135	155	288	253
24	483	926	1,162	4,660	1,150	296	666	185	135	155	279	261
25	398	871	1,327	7,154	2,015	331	740	162	135	178	632	360
26	551	1,054	1,126	7,009	1,560	288	1,495	162	135	200	1,950	305
27	551	1,114	1,353	8,371	2,415	244	950	155	218	218	2,015	314
28	598	1,114	2,130	8,686	1,374	261	480	155	209	244	1,495	305
29	645	1,018	10,918	6,576	1,000	322	370	148	505	322	1,495	296
30	500	.....	7,118	3,556	1,820	322	340	148	360	331	405	279
31	381	.....	4,660	.....	2,348	.....	270	155	.....	261	.....	296
Mean	985	915	2,085	2,523	2,730	621	504	214	201	220	485	377

* Ice gorge below. † Repairing Hinckley dam.

Monthly Discharge of West Canada Creek at Twin Rock Bridge.
[Drainage area, 364 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	2,260	381	985	2.71	3.12
February	3,114	364	915	2.52	2.72
March	10,918	805	2,085	5.73	6.59
April	8,686	950	2,523	6.94	7.77
May	8,608	598	2,730	7.51	8.64
June	3,420	209	621	1.71	1.92
July	1,495	226	504	1.39	1.60
August	455	148	214	0.588	0.676
September	505	135	201	0.553	0.619
October	350	148	220	0.605	0.696
November	2,015	170	485	1.33	1.49
December	950	253	377	1.04	1.20

PRECIPITATION IN UPPER WEST CANADA CREEK DRAINAGE BASIN.

Standard U. S. Weather Bureau rain gages were erected in November, 1905, at North lake, Honnedaga and Hoffmeister. The resulting observations are tabulated in the accompanying tables. The records at North lake are taken by Geo. C. Paull. North lake is located just outside of the West Canada creek watershed line. The observations at Honnedaga are taken by A. D. Barber; those at Hoffmeister are taken by Mrs. Augustus Hoffmeister.

Arrangements have been made to obtain a record of the depth of snow accumulation and of the water equivalent of the snow on ground at each of these stations.

No record was obtained at Honnedaga during 1908.

Daily Precipitation at North Lake.

DAY.	Jan.	April.	June.	July.	Aug.	Sept.	Oct.	Nov.
1908.								
1	*0.30							
2	*0.10							
3						0.53		
4								
5				0.65	0.40			
6						0.10		
7				1.27	0.90			
8								
9								
10							0.92	
11	*0.50							
12							0.75	
13					0.35			
14			1.10					
15				0.25				
16		0.78			1.50			*0.50
17				0.65	0.21			*0.10
18				2.20				
19	*0.15	0.57	2.75					
20								
21				0.30				
22				0.22				
23			1.55					
24								
25		0.25		0.40				
26	*0.50							
27	*0.80							
28								
29								
30		0.60	5.30				1.67	
31								
Total	2.35	2.20	10.70	5.94	3.36	0.63	3.34	0.60

* Snow.

Daily Precipitation near Hoffmeister, N. Y.

DAY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	*0.17	*1.58	*1.65	*0.45	T	0.02				0.25		
2					*0.43				0.05	T	0.01	
3	*T	*T	*T	*T	T		T				0.15	*0.22
4	*0.70		*T				0.18	T				*0.27
5		*1.08		*0.32				1.04			*0.50	
6		0.08	*0.56		T			0.08	0.68			1.15
7	*0.82		*T	T	1.33		1.80	0.27			*0.05	*0.48
8				1.08	0.13		T					
9	*0.05				0.09	0.32				T		*0.05
10			*T	T	T			0.05			0.55	
11				T				T		1.07		
12	0.58				0.10						*0.10	*0.64
13	*T	0.24	T	0.61			0.08	0.15			*T	*T
14	*T	2.15			0.62	0.83						
15	*T	0.67	1.42	0.40			0.29				*0.57	*0.48
16	*0.24		*0.07		0.26							
17		*T	*0.19				2.50	0.70			*0.64	
18	*0.14			0.23					T			
19		*0.90	*T			1.34	T	0.05			0.10	*0.53
20		*T		*0.14	T							
21	0.10	*T			0.18		0.45					*0.26
22	*0.05	*T			0.32			0.04				
23	*0.09	*0.09	0.23			0.18						
24			*T							0.15		
25				0.10			0.71			T	0.03	
26	*1.50	*1.15			0.76					0.37	T	*0.32
27			T	0.43						T	*T	*T
28	*0.30	*T	0.36	T			0.19		1.75	0.84		
29				0.08	0.56	0.06						
30				1.60	1.36	T	T			*T	T	*1.13
31			T							*T		
Total	4.72	7.94	4.48	5.44	6.14	2.75	6.20	2.38	2.48	2.68	2.70	5.53

* Snow. T means trace.

Table Showing Water Equivalent of Accumulated Snow on Ground at Hoffmeister, N. Y., West Canada Drainage Basin.

WINTER OF 1905-06.			WINTER OF 1906-07.			WINTER OF 1907-08.			WINTER OF 1908-09.		
DATE.	Snow in inches.	Water in inches.	DATE.	Snow in inches.	Water in inches.	DATE.	Snow in inches.	Water in inches.	DATE.	Snow in inches.	Water in inches.
Jan. 7	14.5	3.2	Dec. 10	2.0	0.42	Dec. 2	11.0	1.5	Nov. 30	0.0	0.0
Jan. 14	20.5	4.0	Dec. 17	3.0	0.65	Dec. 9	10.0	1.8	Dec. 7	11.0	2.2
Jan. 21	25.0	4.9	Dec. 24	3.5	0.70	Dec. 16	12.0	2.7	Dec. 14	17.0	2.3
Jan. 28	15.0	4.9	Dec. 30	4.0	0.75	Dec. 23	15.0	3.4	Dec. 21	23.0	2.4
Feb. 4	18.0	6.0*	Jan. 7	3.0	0.55	Dec. 30	11.5	3.1	Dec. 28	22.0	5.5
Feb. 12	20.0	6.6*	Jan. 14	7.0	0.60	Jan. 6	21.0	3.6	Jan. 4	27.5	6.7
Feb. 18	23.0	7.6*	Jan. 21	6.0	0.49	Jan. 13	23.5	3.8	Jan. 11	19.0	5.6
Feb. 25	15.0	5.0*	Jan. 28	12.0	4.4	Jan. 20	26.5	4.5	Jan. 18	38.0	6.7
Mar. 4	19.0	7.5	Feb. 4	20.0	7.4	Jan. 27	27.0	4.8	Jan. 25	26.5	8.2
Mar. 11	17.0	8.0	Feb. 11	22.0	4.5	Feb. 3	42.0	4.3	Feb. 1	32.0	6.8
Mar. 18	21.0	8.2	Feb. 18	29.0	4.7	Feb 10	58.0	6 0	Feb. 8	27.0	4.9
Mar. 25	31.0	15.0	Feb. 25	34.0	4.9	Feb. 17	35.0	7.2	Feb. 15	30.0	8.6
April 2	26.0	8.0	Mar. 4	37.0	5 0	Feb. 24	40.0	8.1	Feb. 22	32.0	9.1
April 9	22.0	7.4	Mar. 5	38.0	4.7	Mar. 2	48.0	9.6	Mar. 1	34 5	11.3
April 16	17.0	6.6	Mar. 11	37.0	5.3	Mar. 9	52.0	7.0	Mar. 8	39.0	9.3
April 23	0.0	0.0	Mar. 18	32.0	5.7	Mar. 16	42.5	11.5	Mar. 15	43.0	9.6
....	......	.....	Mar. 24	24.0	7.4	Mar. 23	43.0	6.7	Mar. 22	46.0	11.1
....	......	.....	April 1	14.0	4.2	Mar. 30	28.5	6.0	Mar. 29	54.0	12.0
....	......	.....	April 8	10.0	4.2	April 6	30.0	9.6	April 5	48.0	8.3
....	......	.....	April 15	13.5	5.6	April 13	25.5	7.1	April 12	42.0	9.5
....	......	.....	April 22	13.0	5.7	April 20	20.0	8.7	April 19	26.0	6.3
....	......	.....	April 29	8.0	4.4	April 27	9.0	3.6	April 26	15.0	5.2
....	......	.....	....	.....	.....	May 4	0.0	0.0	....	.....	......

* These figures were obtained by dividing the snow accumulation by 3.0, the snow sample not having been melted by the observer in these cases.

MOHAWK RIVER AT UTICA, N. Y.

A current-meter gaging station was formerly maintained at the Genesee street bridge in Utica, by Robert E. Horton, hydrographer, U. S. Geological Survey, but was discontinued May 1, 1903, owing to changes in the channel, due to the river straightening work begun by the city of Utica. A description of the drainage area of the Mohawk river above Utica, and a record of the discharge for several months at this station are given in the Supplement to the Report of the State Engineer and Surveyor for 1903.

Prior to December, 1908, the gaging station was located at the bridge on the Black River branch of the N. Y. C. & H. R. R., crossing the river about three-quarters of a mile west of Genesee street. It was established March 31, 1905, by C. A. Poole, in cooperation with the U. S. Weather Bureau. The gage is a vertical board, graduated in feet and tenths, and is secured to the southeast wing of the south abutment of the bridge, with its zero mark at elevation 394.81. Observations of the stage of the stream are taken twice each day by Willard E. Young.

This station was established originally for the purpose of obtaining a record of the fluctuation of the water-surface in that vicinity, and has been maintained for that purpose principally. Several current-meter measurements, however, have been made, from which the discharge has been calculated for the different stages of the river at the time of measurement. The location is not favorable, however, for meter measurements, the flow of the stream being sluggish, especially during low water, and the adjacent flats are overflowed during flood stages. On December 4, 1908, the gage was removed to the right-hand abutment of the U. and M. V. R. R. bridge crossing the new Mohawk river channel, North Genesee street, Utica.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Utica, N. Y.[b]

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	401.41	*a*	398.31	400.71	398.76	399.16	396.06	397.21	395.81	395.81	395.71	398.11
2	400.51	*a*	399.11	400.61	398.86	399.06	396.11	397.11	395.81	395.81	395.71	398.11
3	399.51	*a*	399.66	400.56	399.06	398.71	396.26	397.11	395.81	395.81	395.71	398.21
4	*a*	*a*	399.76	400.71	399.16	398.26	396.36	396.96	395.71	395.81	395.71	396.64
5	*a*	*a*	399.51	401.06	399.76	397.81	396.51	396.86	395.71	395.81	395.61	396.64
6	*a*	*a*	399.61	401.46	400.81	397.56	396.31	397.06	395.61	395.71	395.61	396.49
7	*a*	*a*	399.76	401.81	400.86	397.31	396.31	397.06	395.61	395.71	395.61	396.49
8	*a*	*a*	400.06	402.86	400.66	397.11	396.76	397.01	395.61	395.71	395.71	396.54
9	*a*	*a*	400.21	403.86	400.36	397.41	396.56	396.81	395.61	395.71	395.81	396.64
10	398.41	*a*	400.26	403.56	399.66	397.86	396.36	396.66	395.61	395.71	395.81	396.79
11	398.31	*a*	399.66	402.16	399.51	397.66	396.26	396.36	395.51	395.61	395.91	396.69
12	398.61	*a*	399.86	402.06	399.36	397.61	396.06	396.21	395.51	395.61	395.91	396.64
13	399.91	*a*	400.16	401.96	399.16	397.36	396.11	396.11	395.51	395.61	395.81	396.69
14	399.91	398.61	400.26	401.81	398.91	397.26	396.21	396.26	395.51	395.61	395.81	396.79
15	398.96	403.76	400.51	401.86	398.86	397.16	396.36	396.16	395.51	395.61	395.86	396.79
16	398.76	408.21	400.56	401.96	399.16	396.96	396.46	396.21	395.51	395.61	396.06	396.84
17	398.41	405.56	400.66	401.91	399.01	396.81	396.66	396.21	395.51	395.56	396.26	396.84
18	398.51	404.61	400.76	402.16	398.86	396.81	401.41	396.36	395.51	395.51	396.36	396.84
19	398.36	403.01	400.81	401.71	398.66	396.66	401.41	396.21	395.41	395.51	396.56	396.74
20	398.36	402.71	400.96	400.56	398.41	397.26	401.06	396.16	395.41	395.51	396.66	396.99
21	398.36	401.61	400.81	399.66	398.16	397.06	400.06	396.11	395.41	395.51	396.81	397.29
22	398.96	400.66	400.86	399.11	397.91	396.86	399.16	396.06	395.41	395.51	396.96	397.24
23	399.26	399.71	400.66	398.76	397.66	396.76	400.01	395.91	395.41	395.51	397.16	397.04
24	398.71	*a*	400.56	398.51	397.71	396.56	399.26	395.86	395.41	395.51	397.36	396.99
25	398.11	*a*	400.71	398.26	398.21	396.56	397.96	395.81	395.41	395.51	397.56	396.79
26	398.31	*a*	400.76	398.16	398.56	396.46	397.76	395.81	395.41	395.41	397.96	396.74
27	398.61	398.66	400.91	398.26	398.76	396.41	397.71	395.81	395.41	395.41	398.11	396.64
28	398.21	*a*	400.96	398.56	399.06	396.26	397.56	395.81	395.46	395.51	398.21	396.54
29	398.26	*a*	400.96	398.66	399.26	396.21	397.51	395.91	395.71	395.51	398.16	396.69
30	397.91	.....	400.86	398.71	399.26	396.16	397.46	395.96	395.71	395.51	398.11	396.89
31	397.86	.....	400.86	.....	399.46	.....	397.36	395.81	.....	395.61	.....	397.04

a Ice obstruction. *b* At Black River R. R. bridge until Dec. 4, 1908, and at North Genesee St. bridge thereafter.

PRECIPITATION AT SAVAGE RESERVOIR NEAR UTICA, N. Y.

A standard U. S. Weather Bureau pattern rain gage is located at Savage reservoir on the south slope of Mohawk valley about 3 miles southeast of Utica. The gage rim stands 4 feet above ground and is at elevation about 700 feet above tide. The record is furnished by the Consolidated Water Co. of Utica, N. Y.

Daily Precipitation at Savage Reservoir near Utica, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	.....	*.09	.....	.02	*R.76	.87	.....	.....	.....	.....	.....	.09
2	*.01	*.28	*R.95	.20	.07	.06	.....	.....	.03	.46	.....	.....
3	.....	*.04	*R.18	*.04	*R.21	.....	.....	.....	.17	.03	.....	*.06
4	*.04	.....	*.05	*.05	.05	.....	.....	.....	.....	.....	.22	.....
5	.....	.....	.....	.....	.....	.....	.05	.12	.....	.....	*.05	*.04
6	.....	*.26	.....	.21	.....	.....	.....	.52	.....	1.22	*.04	.....
7	.....	*.04	.48	.....	.17	.....	.....	.15	.94	.17	*R.15	*R.24
8	*.90	*.05	.....	.02	1.15	.....	.13	.22	.....	.....	.03	*R.44
9	*.05	.....	.....	.82	.06	.....	.....	.....	.....	.....	.04	*.02
10	*.02	.....	.....	.....	.32	.50	.....	.....	.....	.....	.....	*.02
11	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.26	*.04
12	.10	.....	.....	*R.05	.02	.....	.....	.36	.....	.....	*R.28	*.40
13	.22	.19	.....	.04	.04	.....	.....	.14	.....	.....	*.08	*.03
14	.....	.11	.08	.02	.20	.....	.10	.34	.....	.....	.....	*.01
15	*.01	.35	.....	.....	.26	.07	.....	.....	.....	.....	*.21	.20
16	.....	*R.32	.24	.92	.01	.83	.10	.....	.....	.....	.....	*.01
17	*.02	*.06	*.05	.....	.37	.....	.....	.58	.....	.....	*.08	.....
18	*.03	*.03	*.12	.....	.....	.....	.82	.97	.....	.....	*.07	*.07
19	*.02	*.02	*R.04	.43	.....	.....	1.64	.....	.....	.....	*.16	*.03
20	.....	*.22	*.03	.20	.04	.07	.....	.02	.....	.....	.06	*.08
21	.....	.....	.....	*.16	.03	.....	.....	.....	.....	.....	.....	*.01
22	.....	.....	.....	.....	.....	.....	.95	.02	.....	.....	.....	*.03
23	.....	.....	.....	.....	.25	.....	.13	.06	.....	.....	.....	.....
24	*.04	*.06	.16	.....	.26	.....	.....	.....	.....	.....	.....	.....
25	.....	.....	.09	.....	.....	.15	.03	.....	.....	.16	.02	*.09
26	.....	*.03	.....	.02	.....	.12	.....	.....	.....	.08	.....	*.07
27	*R.42	*.28	.....	.....	.95	.....	.....	.....	.....	.32	.04	*.05
28	*.03	.....	.....	.28	.....	.....	.....	.....	.....	.14	.03	.....
29	*.08	*.02	.16	.04	.....	.....	.....	.....	1.54	.52	.....	.....
30	.....	.....	*R.10	.11	.07	.....	.....	.....	.....	.....	.....	.....
31	.....	.....	.....	.....	.23	.....	.....	.....	.....	.....	.....	*R.21
Total	1.99	2.45	2.73	3.63	5.52	2.67	3.95	3.50	2.68	3.10	1.82	2.24

* Snow. R means rain.

PRECIPITATION AT DEERFIELD RESERVOIR.

A standard U. S. Weather Bureau pattern rain gage was established at Deerfield reservoir in 1903. From January 1, 1901, to June, 1903, a rain gage five inches in diameter was used. This station is located on the north slope of Mohawk valley about 4 miles north of Utica and at elevation about 700 feet above tide. The record is furnished by the Consolidated Water Co. of Utica.

Daily Precipitation at Deerfield Reservoir near Utica, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	*T	*0.01		0.02	0.82	0.88					*T	0.11
2	*T	*0.18	*0.92	0.55	0.01	0.05			0.05	0.30		*0.02
3	*T	*0.04	*0.22	0.04	0.23				0.09			*0.14
4		*0.05	*0.02	0.05	*0.02						0.13	
5							0.06	0.13			*T	*0.05
6		*0.19		0.09				1.30			*0.03	
7		*0.05	0.35	0.03	0.19			0.14	0.44		*0.15	*0.19
8	*0.82	*0.01	*T	0.07	0.70		0.46				0.03	0.30
9	*0.06			0.82	0.04						0.05	*T
10	*T				0.20	1.25					T	
11				0.01				0.01		0.74	0.27	*0.04
12	0.10			T	T			T		0.08	*0.26	*0.37
13	0.11	0.16		0.17	T		T	0.25			*0.14	*0.04
14	*T	0.08	*0.05		0.33		0.08	0.06				*0.02
15	*T	0.39	*T		0.15	0.15	0.01				*0.20	0.27
16		*0.27	*0.21	0.72	0.07	0.53	0.24				*T	0.02
17	*T	*0.04	*0.02		0.53			0.43			*0.10	
18	*0.02	*0.05	*0.07				1.84	0.26			*0.07	0.01
19	*0.02	*0.02	*0.04	0.28			1.14				*0.04	0.10
20		*0.18	*0.02	0.26	0.05	0.14	T	0.03			*0.09	0.02
21		*T		*0.14	0.05							0.02
22	0.05	*0.01			T		0.57	T				
23		*T			0.27		T	0.01				
24	*0.04	*T	0.14			0.46	T		0.01			
25			*0.01	T		0.10	0.05			0.07	0.02	*0.14
26	*T	*0.01		0.06			0.11			0.02	T	0.02
27	*0.15	*0.18			0.49					0.18	0.02	0.08
28	*0.02	*0.01		0.24						0.26	0.05	
29	*0.06	*T	0.20	0.02					1.45	0.57		
30			*T	0.07	0.25	0.07						0.01
31					0.81							0.12
Total	1.43	1.93	2.25	3.64	5.19	3.59	4.56	2.62	2.04	2.22	1.63	2.09

* Snow. T means trace.

Current-meter Discharge Measurements of Mohawk River at Black River R. R. Bridge, Utica, N. Y.

DATE.	Hydrographer.	Gage height	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908. April 22	E. C. Niles	4.40	1,329	1.02	1,359

GRAEFENBURG HYDROPHYSICAL STATION NEAR UTICA, N. Y.

This station is located near Graefenburg reservoir, near Utica, about 4 miles south from the Mohawk river, and at altitude 1,100 feet above tide. This station was established in 1905 by Robert E. Horton for the purpose of determining the relation of rainfall, evaporation and ground water in the typical soils of the Mohawk valley. The station was maintained in co-operation with the U. S. Geological Survey preceding May 1, 1907, when it was turned over to this Department. A detailed description of the station, together with the records preceding 1907, may be

found in the State Engineer's Report for 1906, Supplement, pages 215–245. The records for 1908 are not yet available for publication, excepting the record of precipitation, which is here given.

Daily Precipitation at Graefenburg near Utica, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1		*0.06			0.80	0.16						0.10
2	*0.01	*0.19	1.00	0.17	0.02	0.02			0.02	0.48		
3		0.02	*0.10	*0.05	0.15				0.05			*0.03
4			*0.02	*0.03	0.04						0.10	
5	*0.03						0.04	0.13				*0.03
6				0.17				0.76			*0.03	
7		*0.03	0.35		0.14			0.14	1.28		*0.12	*0.20
8	*0.85	*0.03		0.03	1.22		0.25	0.38			0.02	0.31
9				0.46	0.05	0.56						
10	*T				0.34							*0.02
11										1.05	0.25	*0.03
12	0.08			0.02				0.14		0.15	0.20	*0.36
13	0.18	0.18		0.03	0.02			0.12			*0.07	*0.02
14		0.05	0.05		0.20		0.09	0.09				
15	*T	0.33			0.28	0.06					*0.13	*0.15
16		0.28	0.16	0.50		0.75	0.10					
17		*0.05	*0.02		0.27			0.35			*0.04	
18		0.02	0.08				0.75	1.70			*0.05	*0.05
19	*0.02		0.05	0.32			1.70				0.04	
20		*0.18	0.01	0.19	0.02	0.19					0.04	*0.06
21				*0.18	0.03							
22							0.92					*0.02
23					0.27		0.10	0.07				
24	*0.03	*0.05	*0.15		0.45	0.10						
25			0.04			0.09	0.02			0.04		*0.02
26		*0.02								0.03		*0.06
27	*0.40	*0.24			0.44					0.35	0.02	*0.04
28	*0.02			0.25						0.15	0.01	
29	*0.05	*0.01	0.22	0.03					1.60	0.50		
30			*0.02	0.05	0.04							0.20
31					0.22							
Total	1.67	1.74	2.27	2.48	5.00	1.93	3.97	3.88	1.95	2.75	1.12	1.70

* Snow.

NINE MILE CREEK AT POWELL'S BRIDGE, NEAR STITTVILLE, N. Y.

A gaging station was established at Powell's bridge, one mile below the village of Stittville, November 4, 1905, by C. A. Poole. Observations of the stage of the stream are taken each morning and afternoon by Mrs. Raymer Powell, from a weight-and-chain gage attached to the bottom chord on the down-stream side of the bridge.

Nine Mile creek drains a large portion of the territory on the north side of the Mohawk river between Utica and Rome, emptying into the latter stream near Oriskany. Its channel will be improved and used as a feeder for the diversion of water from West Canada creek to the summit level of the improved Erie canal, ac-

cording to present plans. The drainage area above the station is 62.6 square miles.

A gaging station was maintained at this point by the U. S. Deep Waterways Commission during their survey in 1898. At that time there was a dam about 200 feet below the bridge, which has since been destroyed, leaving the flow unimpeded. The channel is of rock, of uniform cross-section and straight for several hundred feet each way from the bridge, and the conditions are very favorable for current-meter discharge measurements, which are made from the up-stream side of the bridge.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Nine Mile Creek near Stittville, N. Y.

DAY.
1908.
1
2
3
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30
31

Current-meter Discharge Measurements of Nine Mile Creek near Stittville, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet*	*Ft. per second.*	*Second-feet.*
April 20	E. C. Niles	2.76	85.0	1.62	138
May 12	Weeks and Clark	2.63	73.1	1.13	83.0
May 26	A. T. Clark	2.40	56.0	0.64	35.8
Aug. 20	Weeks and Clark	2.14	41.0	0.395	16.2
Aug. 28	A. R. Patchke	2.16	40.0	0.176	7.03
Sept. 4	Weeks and Patchke	1.90	25.4	0.254	6.44
Sept. 15	A. R. Patchke	2.10	36.9	0.165	6.08
Sept. 30	Weeks and Quinn	2.20	43.5	0.414	18.0

MOHAWK RIVER BELOW STATE DAM AT ROME, N. Y.

A staff gage with painted tenth-foot marks is attached to the down-stream end of the right-hand abutment of the State feeder dam at Rome. Readings are taken each morning by John Phillips.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River below State Dam at Rome, N. Y.

MOHAWK RIVER ABOVE STATE DAM AT ROME, N. Y.

A vertical gage with painted tenth-foot marks is attached to a large elm tree in the entrance to the Erie canal feeder about 100 feet up-stream from the right-hand end of the State dam. Readings are taken each morning by John Phillips. The zero of the gage is at elevation 430.00.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River above State Dam at Rome, N. Y.

DAY.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	432.4	431.5	433.0	432.8	435.5	432.1	431.0	430.2	429.5	430.8	431.4	431.6
2	432.0	431.4	433.0	433.4	433.1	431.6	431.1	430.1	429.5	430.8	431.3	431.8
3	431.9	431.4	433.0	433.2	433.7	431.6	431.1	430.1	429.6	430.7	431.2	431.6
4	431.7	431.4	432.8	432.9	433.1	431.5	431.1	429.6	429.5	430.8	431.0	431.6
5	432.6	431.3	432.8	432.7	432.7	431.5	431.2	429.7	429.5	430.8	430.4	431.6
6	432.5	431.3	432.8	433.7	432.3	431.4	431.1	429.8	429.5	429.6	430.1	431.6
7	432.4	431.3	432.8	433.8	431.7	431.4	431.0	429.9	429.6	429.4	430.1	431.6
8	432.4	431.3	432.0	434.6	434.8	431.4	431.8	429.8	429.6	429.5	430.6	432.0
9	432.4	431.4	432.0	437.2	433.1	431.4	431.5	429.8	429.7	429.5	431.2	432.0
10	432.4	431.4	431.9	433.7	432.6	431.5	431.2	429.8	429.7	429.5	431.2	432.0
11	432.3	431.4	431.9	434.1	432.4	431.5	430.8	429.6	429.7	429.4	431.7	432.0
12	431.7	431.4	431.8	433.1	432.2	431.5	430.8	429.6	429.7	429.5	431.8	432.0
13	432.3	431.5	432.4	433.1	431.7	431.2	430.8	429.7	429.7	429.5	431.8	431.8
14	432.0	431.6	432.9	432.9	433.1	431.2	430.8	430.0	429.7	429.7	431.8	431.8
15	431.8	432.1	433.3	432.7	432.1	431.4	431.0	429.6	429.7	429.7	430.4	432.0
16	431.5	439.0	436.6	432.9	431.9	431.8	431.0	429.6	429.6	429.7	430.2	432.2
17	431.5	438.0	433.6	432.2	432.1	431.6	431.0	429.6	429.6	429.7	431.2	432.0
18	431.5	437.0	433.4	432.1	431.7	431.4	434.6	430.9	429.5	429.5	431.4	432.0
19	431.8	435.0	433.2	433.1	431.6	431.4	433.0	430.4	429.5	429.7	431.4	431.8
20	431.7	434.6	432.7	433.1	431.1	433.0	432.6	429.8	429.5	429.7	431.8	431.8
21	431.6	434.0	432.3	432.1	431.1	431.6	431.3	431.5	429.5	429.7	431.8	431.8
22	431.8	434.0	432.3	432.0	431.0	431.6	433.1	429.5	429.5	429.6	431.8	431.7
23	431.9	434.6	432.4	432.0	431.2	431.6	431.9	429.6	429.6	429.6	431.9	431.7
24	431.8	434.0	433.1	431.9	431.0	431.6	431.6	429.6	429.6	429.7	432.0	431.6
25	431.7	433.6	433.7	431.9	430.5	431.5	431.5	429.6	429.6	429.7	432.3	431.6
26	431.9	433.0	432.7	432.1	430.5	431.3	431.7	429.6	429.5	429.8	432.2	431.6
27	431.7	432.8	436.1	432.0	431.6	431.2	431.5	429.5	429.5	431.0	432.2	431.7
28	431.7	432.6	436.6	432.6	431.5	431.2	431.3	429.6	429.5	430.8	432.0	431.7
29	431.5	432.6	437.0	432.2	431.2	431.2	431.3	429.6	431.5	432.0	431.8	431.7
30	431.5	......	433.2	432.2	431.6	431.3	431.3	429.5	431.0	431.5	431.8	431.6
31	431.5	......	433.1	......	432.9	......	431.3	429.5	......	431.4	......	431.6

MOHAWK RIVER AT FLOYD AVENUE, ROME, N. Y.

A box-and-chain gage was erected by E. F. Weeks, of this Department, at Riverside bridge crossing Mohawk river near Rome, July 9, 1907. The gage is attached to the up-stream hand-rail near the left-hand end of the bridge. The gage reads from zero to 7.5 feet. The standard chain length is 18.98 feet and the elevation of water-surface, when the gage reads zero, is 445.09. Readings are taken each morning and afternoon by Earl R. Williams. A bench-mark located at the junction of the up-stream wing wall and left-hand abutment is at elevation 460.80. The channel is spread for some distance up-stream and down-stream from the bridge. Current-meter measurements are made on the down-stream side, the initial point being the face of the right-hand abutment. A crude dam or barrier of boulders has been placed across the stream a few hundred feet down-stream for the purpose of raising the water-level to produce an ice pond.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River at Floyd Ave Bridge, Rome, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	447.39	446.69	446.69	448.01	449.24	447.29	446.69	446.67	446.59	446.64	446.71	447.01
2	447.14	446.69	446.97	448.37	447.71	446.84	446.69	446.64	446.57	446.59	446.61	446.91
3	446.97	446.69	447.44	447.64	448.01	446.77	446.71	446.59	446.61	446.59	446.64	446.79
4	446.84	446.69	447.14	447.27	447.44	446.79	446.69	446.69	446.61	446.57	446.67	446.91
5	446.74	446.69	447.07	447.11	447.14	446.77	446.69	446.64	446.57	446.57	446.69	446.91
6	446.77	446.69	446.97	448.64	447.01	446.79	446.64	446.77	446.59	446.57	446.69	446.94
7	446.89	446.69	446.94	448.64	447.94	446.81	446.69	446.71	446.67	446.54	446.69	447.41
8	446.94	446.69	446.81	449.29	449.01	446.77	447.29	446.71	446.61	446.54	446.74	448.09
9	446.89	446.69	446.84	449.41	447.71	447.31	446.79	446.61	446.54	446.57	446.87	447.59
10	446.79	446.69	446.87	448.09	447.39	446.94	446.74	446.67	446.59	446.57	446.89	447.59
11	446.79	446.69	446.94	448.49	447.14	446.81	446.69	446.59	446.64	446.87	447.19	447.57
12	446.94	446.69	447.07	447.79	446.99	446.79	446.61	446.61	446.67	446.74	447.21	447.71
13	447.69	446.89	447.29	447.77	446.91	446.69	446.61	446.77	446.57	446.79	446.89	447.69
14	447.24	447.17	447.99	447.51	447.29	446.69	446.64	446.74	446.57	446.59	446.84	447.61
15	446.89	450.14	449.01	447.77	447.24	446.94	446.64	446.77	446.59	446.64	446.79	447.84
16	446.84	450.19	449.42	447.81	447.04	446.99	446.61	446.64	446.57	446.59	446.81	447.99
17	446.74	448.99	448.14	447.39	447.31	446.79	446.74	446.59	446.59	446.59	446.87	447.54
18	446.79	448.31	447.74	447.34	447.07	446.79	449.27	446.99	446.61	446.64	446.81	447.54
19	446.74	447.74	447.44	447.79	446.87	446.71	448.17	446.79	446.61	446.59	446.81	447.09
20	446.69	447.57	447.17	447.49	446.74	448.64	447.19	446.67	446.61	446.67	447.24	447.07
21	446.71	447.39	446.97	447.24	446.79	447.04	446.97	446.64	446.59	446.61	447.01	446.91
22	446.89	447.27	447.14	447.14	446.77	446.87	447.99	446.67	446.59	446.59	446.89	446.89
23	447.01	447.07	447.47	447.19	446.77	446.89	447.09	446.64	446.59	446.57	447.24	446.91
24	446.69	446.97	448.14	447.17	446.67	446.84	446.89	446.61	446.51	446.59	447.59	446.91
25	446.69	446.89	448.54	447.19	446.67	446.94	447.21	446.59	446.54	446.71	447.94	446.99
26	446.74	446.89	450.09	447.24	446.99	446.81	447.09	446.57	446.57	446.87	447.51	447.29
27	446.77	446.81	449.79	447.07	447.04	446.77	446.84	446.59	446.64	446.94	447.24	447.41
28	446.71	446.77	450.42	447.31	446.84	446.74	446.77	446.57	446.54	446.84	447.04	447.01
29	446.69	446.77	459.87	447.14	446.79	446.69	446.79	446.51	447.04	447.11	446.91	446.99
30	446.69	......	448.69	447.07	446.79	446.77	446.69	446.54	446.64	446.79	446.89	447.01
31	446.69	......	448.11	......	447.39	......	446.69	446.59	......	446.69	......	447.19

NOTE.—January 30-February 12, gage read to ice surface.

Current-meter Discharge Measurements of Mohawk River at Floyd Ave. Bridge, Rome, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Feb. 13	Weeks and Patchke	1.94	243	0.618	*149
Feb. 17	Clark and Patchke	3.72	571	4.43	2,528
April 22	E. C. Niles	2.02	420	1.12	470
May 11	Clark and Weeks	2.06	409	1.24	507
May 27	A. T. Clark	1.89	392	0.987	387
June 18	A. T. Clark	1.76	379	0.750	284
July 19	A. R. Patchke	2.66	470	2.25	1,059
Aug. 24	A. R. Patchke	1.45	364	0.44	161
Sept. 9	Niles and Overocker	1.48	337	0.54	181
Sept. 13	D. W. Overocker	1.55	371	0.58	215
Oct. 6	Weeks and Quinn	1.48	352	0.58	205

* Ice measurement. Water-surface to under ice surface, 1.01 = gage-reading of 0.93.

MOHAWK RIVER BELOW DAM AT RIDGE MILLS, N. Y.

Ridge Mills is located on Mohawk river two miles north of Rome, N. Y. The dam and water-power are utilized in conjunction with the Municipal Water Works Pumping Station. The gage was established at the lower line of the city property May 3, 1904. The gage is a vertical staff attached to a tree on the right-

hand bank of the Mohawk river one-third mile below the dam. The gage zero is at elevation 454.79. A reading is taken each morning by Daniel Brown.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River below Dam at Ridge Mills, N. Y.a

a Record probably unreliable, subject to revision.

MOHAWK RIVER ABOVE DAM AT RIDGE MILLS, N. Y.

The gage is attached to the up-stream face of the left-hand abutment of the dam. The zero mark was at elevation 464.63 preceding January 22, 1907, and at elevation 465.00 after that date. Readings are taken each morning by Daniel Brown. The stage of the stream above the dam is affected by diversion to the turbines in the adjacent pumping station. Black River canal runs parallel to Mohawk river at this point. Current-meter measurements, to determine the volume of flow in the canal, are shown in the accompanying table.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River above Dam at Ridge Mills, N. Y.[a]

[a] Record probably unreliable, subject to revision.

Current-meter Discharge Measurements of Black River Canal at Ridge Mills, N. Y.

DATE.	Hydrographer	Gage height.	Area of section	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
June 18.	Clark and Weeks	10 18	143	0 748	107
July 19.	A. R. Patchke	9 65	158	0 855	135
Aug. 26...	A. R. Patchke	9 85	158	0 652	103
Sept. 9.	Niles and Overocker	9 85	154	0 614	94 5
Sept. 13	D. W. Overocker	10 00	149	0 745	111
Oct. 6.	Weeks and Quinn	9 95	156	0 725	113

MOHAWK RIVER NEAR DELTA, N. Y.

A current-meter gaging station was established at the highway bridge over the Mohawk river just below Lock No. 7, Black River canal, and about two miles below Delta, August 20, 1905, by C. A. Poole. The gage is a vertical board, graduated to feet and tenths, and is secured to the south wing of the east abutment of bridge with its zero elevation 479.0. Observations of the stage of the stream are taken each morning and evening by Fred Miller.

During ordinary stages of the river, discharge measurements have been made from the bridge, which consists of one span of

101.6 feet. In low water the measurements are made by fording the stream about 1,000 feet above the bridge, where there is a straight channel of uniform cross-section. The channel at the bridge is of gravel and of uniform section directly under the bridge, but there is a small island about 150 feet up-stream, which affects the flow during the low stages.

The yield of the watershed above this point is influenced considerably by the Black River canal, which receives its initial supply from the Black river watershed and an additional supply from the Mohawk river at Delta. The diversion at Delta is in some measure counterbalanced by the water which returns to the river from seepage through the canal banks and flow over waste-weirs.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River near Lock No. 7 below Delta, N. Y

MOHAWK RIVER BELOW DAM AT DELTA, N. Y.

A vertical staff gage was erected on the down-stream end of the feed mill on the right-hand bank of the Mohawk river below dam at Delta, May 3, 1904. The gage is divided to feet and tenths by coppered staples and reads from zero to nine feet. Readings

of this gage and also of the gage above the dam are taken each morning by E. A. Evans. The zero mark of the gage below the dam is at elevation 502.00.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River below Dam at Della, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	503.80	502.80	502.90	504.60	506.50	503.50	502.80	502.70	502.80	502.90	502.90	503.30
2	503.50	502.80	503.00	505.10	504.30	503.10	502.70	502.70	502.90	502.80	502.90	502.60
3	503.10	502.80	503.70	504.10	504.50	502.90	502.80	502.70	502.80	502.90	502.80	502.60
4	502.90	502.70	503.40	503.80	504.00	502.90	502.80	502.80	502.80	502.90	502.90	502.70
5	503.10	*a*	503.10	503.90	503.40	502.80	502.70	502.80	502.80	502.90	502.90	502.70
6	503.10	*a*	503.00	505.60	503.30	502.80	502.70	502.80	502.80	502.90	502.90	502.50
7	503.00	*a*	503.00	505.30	504.50	502.80	502.70	502.80	502.90	502.90	502.90	502.70
8	503.10	*a*	503.10	506.80	505.50	502.80	503.70	502.80	502.90	502.80	503.00	503.30
9	503.10	*a*	503.10	506.80	504.10	502.70	503.20	502.80	502.90	502.80	503.10	502.90
10	502.90	*a*	502.90	504.70	503.80	503.10	502.80	502.70	502.90	502.80	503.10	502.80
11	502.90	*a*	503.00	505.30	503.30	503.00	502.80	502.70	502.90	503.10	503.40	502.80
12	503.00	*a*	503.10	504.30	503.30	502.90	502.70	502.70	502.90	502.90	503.40	502.90
13	504.30	502.60	503.60	504.10	503.20	502.80	502.80	503.00	502.90	502.90	503.10	502.90
14	503.30	502.80	504.30	503.80	503.30	502.80	502.80	502.90	502.90	502.80	503.10	502.80
15	503.10	507.80	504.40	504.00	503.60	503.20	502.70	502.80	502.90	502.90	503.00	502.80
16	503.10	507.30	506.30	504.20	503.40	503.30	502.70	502.80	502.90	502.90	503.00	503.50
17	502.90	505.30	504.80	503.60	504.30	503.00	502.70	*a*	502.90	502.90	503.00	503.20
18	502.90	504.70	504.30	503.70	503.30	502.90	506.50	*b*	502.90	502.90	503.00	503.10
19	502.90	504.30	504.00	504.30	503.10	502.80	504.80	502.80	502.90	502.90	503.10	503.00
20	502.90	503.80	503.60	503.80	503.00	505.30	503.60	502.80	502.80	502.80	503.60	503.00
21	502.80	503.80	503.40	503.60	503.00	503.30	503.10	502.70	502.90	502.90	503.20	503.00
22	503.00	503.50	503.50	503.40	502.90	503.00	504.80	503.00	502.90	502.80	503.10	502.80
23	502.90	503.30	503.80	503.60	502.90	503.30	503.30	502.80	502.90	502.80	503.40	502.70
24	502.90	503.20	505.00	503.50	502.80	503.00	503.00	502.80	502.90	502.80	503.90	502.70
25	502.70	503.10	504.70	503.50	502.80	503.10	502.90	502.80	502.90	502.90	504.30	502.90
26	503.00	503.20	504.40	503.70	502.80	502.90	503.30	502.70	502.90	503.00	504.00	502.90
27	503.00	503.10	506.90	503.40	503.20	502.80	503.10	502.80	502.90	503.10	503.60	502.90
28	502.90	503.00	507.85	503.90	503.10	502.80	502.90	502.80	502.90	503.00	503.30	502.80
29	502.80	503.00	505.40	503.60	502.80	502.70	502.80	502.80	503.30	503.30	503.10	502.80
30	502.80	......	504.90	503.30	502.90	502.80	502.70	502.80	503.10	503.00	503.00	502.80
31	502.70	......	504.80	......	503.70	......	502.80	502.80	......	502.90	......	502.90

a Ice obstruction; no record. *b* No record.

MOHAWK RIVER ABOVE DAM AT DELTA, N. Y.

The gage above the dam was established May 3, 1904. The gage is attached to the face of the right-hand abutment. It is subdivided to tenths of feet by coppered staples and reads from 1.5 feet to 4 feet. The flow of the stream is utilized in the adjacent mills and in addition diversion is made to the Black River canal during the navigation season through the Delta feeder. The zero mark of the gage above the dam is at elevation 507.63. The crest of the dam is at elevation about 509.4.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Mohawk River above Dam at Delta, N. Y.

DAY.	Jan.	Feb.	March	c.
1908.				
1	509.73	509.33	509.32	.52
2	509.53	509.43	509.42	.93
3	509.43	509.32	509.63	.08
4	509.33	509.33	509.63	.33
5	509.43	509.33	509.42	.33
6	509.43	509.33	510.42	.08
7	509.33	509.33	509.42	.33
8	509.43	509.23	509.42	.63
9	509.43	509.33	509.32	.53
10	509.33	509.23	509.32	.33
11	509.33	509.23	509.32	.33
12	509.43	509.13	509.42	.43
13	509.93	509.13	509.62	.43
14	509.73	5.0.22	5.0.62	.33
15	509.43	510.83	510.02	.33
16	509.43	510.83	510.62	.63
17	509.43	510.23	510.32	.53
18	509.43	510.13	509.92	.43
19	509.23	510.03	509.62	.43
20	509.33	509.63	5.9.62	.43
21	509.33	509.73	509.52	.43
22	509.53	509.63	509.52	.33
23	509.43	509.53	509.63	.13
24	509.43	509.43	510.12	.33
25	509.13	509.43	510.12	.33
26	509.43	509.43	510.?2	.33
27	509.43	509.33	510.72	.33
28	509.33	509.83	511.12	.23
29	509.33	509.33	510.72	.33
30	509.23		510.12	.23
31	509.33	....	510.12	.33

a No record.

UPPER HUDSON RIVER DRAINAGE BASIN.

DESCRIPTION.

Upper Hudson river comprises the drainage basin above tidewater influence at Troy and also above the mouth of Mohawk river at Waterford.

The head-water region is mountainous in character, in general heavily wooded, and dotted with numerous lakes and ponds. The rocks, belonging to the oldest formation and mainly granite, are either bare or covered with only a layer of spruce duff, humus and forest litter. The river emerges from the mountain region a few miles west of Glens Falls, and thence to Troy the topography is moderately rolling and the surface soil is chiefly sand.

The fall in the upper portion of the course is very rapid, amounting to about 64 feet per mile from Lake Tear-of-the-Clouds to North creek, a distance of about 52 miles. From the mouth of North creek to the mouth of the Sacandaga the descent is nearly 14 feet per mile, distributed among rapids which diminish in frequency as the Sacandaga is approached. In the succeeding 26 miles to Fort Edward the river descends 418 feet

more, but of this 175 feet is comprised within the three abrupt pitches at Palmer, Glens and Bakers falls, while most of the remainder occurs in the rapids between Jessups Landing and the oxbow above Glens Falls. Between Glens Falls and Troy nearly the entire fall of the river is utilized for the development of water-power.

The flow of the upper Hudson is controlled to some extent during the dry season by the use of Indian lake storage reservoir, and the facilities for storage works in this part of the basin are unsurpassed. The entire region is dotted with ponds and lakes, many of them of large size and fed from extensive drainage areas. Saratoga lake serves as a regulator of Fish creek, and there is a small reservoir at the head waters of the Hoosic.

Gaging stations have been maintained on the upper Hudson river in 1907 at various stations for the purpose of determining the water-surface elevation. In addition records are kept at Mechanicville, Fort Edward and Corinth, from which the discharge is determined.

HUDSON RIVER BELOW STATE DAM, TROY, N. Y.

This gage was established January 19, 1903, by E. A. Lamb. The present gage is vertical and is in two sections. The lower section, reading from zero to 13 feet, is attached to the face of the wall of the sloop lock at the left-hand, or Troy end of the dam. The upper section, reading from 13 to 21 feet, is painted on the down-stream end of the same wall. The gages are below the lower miter gates and are on the side of the lock adjoining the timber crib forming the dam abutment. A third section, reading from 20 to 24 feet, is attached to the southwest corner of Orr & Co.'s paper mill. The gages at the State dam at Troy are maintained in coöperation with the U. S. Weather Bureau. The readings are taken each morning and afternoon by John B. Mackey. The zero mark of the gage below the dam is at elevation 0.084. The gages are referred to a bench-mark consisting of a copper plug in the top of the lock wall between the anchors of the southwest gate. Elevation of the bench-mark is 21.564 (Weather Bureau datum).[a]

[a] The water-surface elevations published in the 1907 report, p. 544, were referred to the Weather Bureau datum and not to the Barge canal datum, as there stated.

The water level is affected both by tides and by the flow in the river.

Mean Daily Elevation of Water-surface (Weather Bureau Datum) of Hudson River below State Dam at Troy, N. Y.

DAY.	Jan.	Fe	v	Dec.
1906.				
1	8 93	4	.83	3 43
2	8 39	4	.33	2 93
3	8 08	4	.28	2 18
4	7 88	4	.33	2 56
5	7 88	4	.78	2.73
6	7 38	4	98	2 53
7	7 88	4	.33	3 18
8	7 68	4	58	2 36
9	7 68	4	.58	3 68
10	7 78	5	.56	3 48
11	7 68	5	53	3 18
12	6 73	5	.88	3 53
13	6 33	5	73	2 93
14	5 38	11	.53	2.43
15	5 48	15	06	2.06
16	5 83	18	.88	2.43
17	6 13	18	03	2.18
18	5 33	14	.53	3.18
19	5 38	15	73	3.53
20	5 23	15	23	4.33
21	5 33	14	.68	4 33
22	5 68	14	83	2 53
23	5 23	14	.28	2 03
24	4 98	15	.53	2 58
25	4 78	15	43	1 93
26	5 28	13	.53	1 48
27	4 93	13	.28	1.83
28	4 53	11	68	2 18
29	4 83	11	58	2 58
30	4 98		28	2 28
31	4 53	..	..	2 03

HUDSON RIVER ABOVE STATE DAM, TROY, N. Y.

This gage was established November 15, 1904, by C. A. Poole, and it is in two sections. The lower portion, reading from 2 to 12 feet, is attached to the timber crib forming the left-hand abutment of the dam. The gage is just up-stream from the sloop lock on the canal side of the crib. The upper section of the gage, reading from 12 to 16 feet, is attached to a tree growing on the earth filling of the timber crib. Elevation of water-surface, when the gage reads zero, equals 9.444.[a] The water-level is affected both by the volume of flow and by the use of water in the adjoining mills.

[a] The water-surface elevations published in the 1907 report, p. 545, were referred to the Weather Bureau datum and not the Barge canal datum, as there stated.

Mean Daily Elevation of Water-surface (Weather Bureau Datum) of Hudson River above State Dam at Troy, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	17.04	14.59	15.44	19.44	17.94	15.24	13.69	13.64	13.44	13.44	14.04	13.94
2	16.59	14.54	15.34	18.94	18.29	15.74	13.64	13.74	13.39	13.54	14.09	13.99
3	16.34	14.44	15.54	18.94	18.94	15.24	13.59	13.84	13.34	13.39	13.94	13.99
4	16.14	14.44	15.34	18.99	17.94	14.94	13.69	13.74	13.44	13.44	13.79	13.94
5	16.04	14.34	15.19	18.94	17.79	14.69	13.74	13.84	13.39	13.49	13.64	13.99
6	16.09	14.34	15.34	18.59	17.34	14.44	13.64	13.89	13.34	13.49	13.59	13.99
7	16.14	14.39	15.44	18.59	17.39	14.49	13.59	13.89	13.44	13.44	13.49	14.14
8	16.09	14.44	15.44	18.54	18.49	14.39	13.44	13.79	13.69	13.34	13.64	14.14
9	16.19	14.84	15.54	18.44	18.69	14.44	13.64	13.79	13.64	13.39	13.74	14.34
10	16.24	15.04	15.69	18.84	18.24	14.29	13.54	13.84	13.59	13.44	13.79	14.29
11	16.24	15.09	15.79	18.64	17.69	14.34	13.49	13.74	13.49	13.59	13.64	14.54
12	16.19	15.29	15.89	18.34	17.14	14.24	13.44	13.74	13.44	13.44	13.59	14.79
13	16.04	16.09	16.09	18.14	16.74	14.39	13.74	13.79	13.54	13.39	13.74	14.54
14	15.74	16.44	16.24	18.04	16.79	14.14	13.74	13.74	13.49	13.44	13.74	14.64
15	15.64	19.99	16.24	17.79	17.34	13.94	13.14	13.79	13.54	13.34	14.04	14.64
16	15.64	20.44	16.54	17.39	17.94	14.29	13.34	13.84	13.44	13.39	14.04	14.49
17	15.59	18.94	16.44	17.14	16.84	14.44	13.44	13.74	13.39	13.34	14.04	14.44
18	15.44	18.84	16.34	17.04	16.64	14.14	13.49	14.09	13.44	13.64	13.99	14.44
19	15.44	18.74	16.24	16.94	16.09	13.99	13.79	14.74	13.49	13.34	14.04	14.39
20	15.34	18.64	16.34	16.94	15.84	13.79	13.64	14.64	13.54	13.24	13.94	14.24
21	15.24	17.79	16.09	16.89	15.84	14.34	13.94	14.54	13.34	13.44	13.99	14.29
22	15.14	16.44	15.94	16.74	15.59	14.24	13.69	14.39	13.34	13.49	13.99	14.34
23	15.04	16.89	15.99	16.64	16.09	13.89	13.84	13.74	13.24	13.44	13.94	14.74
24	14.94	17.49	18.14	16.44	16.49	13.94	14.04	13.69	13.44	13.39	13.99	14.84
25	14.64	16.94	18.44	16.39	15.99	13.99	14.04	13.74	13.34	13.64	13.94	14.94
26	14.49	15.94	19.64	16.64	15.49	14.04	13.74	13.64	13.29	13.64	14.04	14.89
27	14.54	15.44	20.24	16.94	15.44	13.69	13.54	13.69	13.39	13.74	14.09	15.14
28	14.54	15.34	19.79	17.19	15.44	13.74	13.49	13.74	13.44	13.89	14.04	15.09
29	14.49	15.44	19.64	17.29	15.39	13.64	13.74	13.64	13.24	13.74	13.99	15.09
30	14.44	......	19.84	17.79	15.19	13.64	13.64	13.44	13.34	13.99	13.99	14.94
31	14.64	......	19.54	......	15.29	......	13.69	13.44	......	14.14	......	14.89

HUDSON RIVER BELOW DAM OF HUDSON RIVER POWER CO., TWO MILES BELOW MECHANICVILLE, N. Y.

This gage is located on the right-hand bank of Hudson river about one-quarter mile down-stream from the dam of the Hudson River Power Co. A vertical staff gage divided decimally from zero to 16 feet is placed within a square wooden well-curb on the stream bank. The interior of the well communicates freely with the water in the river by means of a buried pipe. The gage was established August 18, 1905, by this Department, and readings are taken at 8 A. M. and 5 P. M. each day by H. C. Tinker. The zero mark of the gage is at elevation 29.00.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River below Hudson River Power Co.'s Dam near Mechanicville, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	33.90	30.90	31.65	36.05	36.40	32.40	30.45	30.35	30.40	30.20	30.20	30.80
2	33.70	30.95	31.65	35.50	36.75	32.50	30.40	30.20	30.50	30.40	30.45	30.55
3	33.45	30.95	31.85	35.20	36.75	32.45	29.70	30.15	30.15	30.35	30.50	30.45
4	33.00	31.05	31.90	34.40	36.40	31.30	30.20	30.45	30.25	29.55	30.30	30.50
5	32.90	30.95	31.80	33.55	35.70	31.25	30.20	30.35	30.05	30.40	30.35	30.40
6	32.80	31.00	31.95	33.70	35.30	30.90	30.60	30.35	30.10	30.30	30.30	30.00
7	32.15	31.90	31.60	33.65	34.80	30.60	30.60	30.55	30.15	30.30	30.30	30.50
8	31.95	31.90	31.35	34.00	35.65	31.30	30.55	30.55	30.25	30.35	30.20	30.40
9	31.95	31.00	31.85	35.65	35.75	31.25	30.50	30.35	30.20	30.35	30.35	30.45
10	31.95	31.80	32.00	35.85	35.65	30.90	30.45	30.60	30.55	30.25	30.30	30.45
11	31.95	31.05	31.80	35.80	35.55	30.85	30.35	30.40	30.25	30.10	30.30	30.45
12	31.65	30.75	32.10	35.90	34.70	30.80	30.30	30.45	30.35	30.20	30.20	30.50
13	32.65	31.05	32.90	35.75	34.40	30.75	30.45	30.35	30.25	30.15	30.35	30.05
14	32.35	31.00	34.35	35.60	34.65	30.35	30.45	30.25	29.55	30.15	30.15	30.80
15	31.85	33.75	34.00	35.20	34.90	30.50	30.45	30.35	30.30	30.10	30.15	30.45
16	31.70	35.65	34.35	34.90	34.40	31.50	30.20	30.15	30.20	30.20	30.35	30.80
17	31.45	34.50	33.60	34.50	34.10	31.05	30.50	30.45	30.15	30.15	30.80	30.40
18	31.60	33.85	33.25	34.45	33.20	30.70	30.25	30.50	30.35	30.00	30.50	30.55
19	31.30	33.75	33.10	34.30	33.20	30.55	30.30	30.60	30.10	30.30	30.50	30.60
20	31.45	33.40	33.00	34.60	33.15	30.55	30.35	30.50	30.50	30.15	30.30	30.05
21	31.40	33.45	32.85	34.20	33.10	30.30	30.55	30.40	29.65	30.20	30.35	30.20
22	31.35	33.10	32.65	33.90	32.85	30.45	30.85	30.30	30.15	30.10	30.25	30.30
23	31.55	32.85	32.95	33.70	33.40	30.90	30.60	30.25	29.55	30.25	30.45	30.30
24	31.35	32.60	33.80	33.60	33.20	30.80	30.65	30.35	30.15	30.20	30.45	30.30
25	31.35	32.25	34.35	34.05	32.90	30.40	30.65	30.40	30.20	30.15	30.45	30.35
26	31.10	32.10	33.70	34.55	32.40	30.65	30.55	30.50	30.25	30.25	30.25	30.20
27	31.15	32.10	34.20	35.50	32.40	30.45	30.65	30.35	30.10	30.30	30.30	30.30
28	31.55	32.15	34.95	36.35	31.80	30.15	30.45	30.45	29.60	30.30	30.65	30.20
29	31.20	31.60	36.05	36.75	31.80	30.40	30.30	30.15	30.15	31.10	30.30	30.30
30	31.30	.....	36.70	36.70	31.60	30.50	30.35	30.65	30.20	30.45	30.65	30.30
31	31.25	.....	36.55	.....	31.95	.....	30.50	30.35	.....	30.50	.....	30.30

HUDSON RIVER ABOVE DAM OF HUDSON RIVER POWER CO., TWO MILES BELOW MECHANICVILLE, N. Y.

This gage was established August 18, 1905, by this Department. The gage is a vertical staff divided to feet and tenths and reading from zero to 16 feet. It is attached to the up-stream face of the river wall at the right-hand end of the line of waste-gates forming a continuation of the dam. Readings are taken at 8 A. M. and 5 P. M. by H. C. Tinker. The gage zero is at elevation 43.00. A record is kept in the adjoining power-plant, showing the use of water by the turbine wheels, and also the waste over the dam, through gates, etc.

The accompanying tables show the discharge as calculated at the power plant. The crest of the dam is of the ogee type, but the discharge is calculated by the East Indian engineer's formula for dams with broad crests.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Hudson River Power Co.'s Dam near Mechanicville, N. Y.

DAY.	Jan.	Feb.	March.	April.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	50 25	49 25	49 50	51 55	51 25	49 45	49 50	49 50	49 35	49 30	48.80	49.40
2	50 20	49 50	48 95	51 15	51 40	49 00	48 50	49 20	49 20	49 30	49 40	49.40
3	49 70	49 35	49 15	51 00	51 70	48 85	48 70	49 40	49 35	49 45	49 35	49 35
4	49 85	49 00	49 30	50 35	51 40	48 90	49 30	49 30	48 95	49 05	49 25	49.30
5	50 15	49 30	48 45	50 50	50 90	48 60	49 30	48 75	49 30	49 35	49 35	49 30
6	50 05	49 35	47 90	49 90	50 60	47 80	49 35	49 15	48 60	49 20	49 20	48 90
7	49 10	49 40	48 00	49 65	50 50	48 00	49 00	49 15	48 90	49 10	49 35	49 35
8	49 10	49 45	48 05	49 85	50 75	47 85	48 65	49 10	49 25	49 20	48 95	49.40
9	49 00	49 50	48 00	51 15	51 10	48 90	49 15	49 25	49 25	49 15	49 40	49.40
10	49 00	49 45	48 00	51 30	51 20	49 05	49 05	49 45	49 25	49 35	49 10	49 40
11	48 55	49 40	48 25	51 30	50 95	48 80	49 05	49 20	49 40	49 05	49 15	49 35
12	49 55	49 50	48 45	51 90	50 35	48 40	49 35	49 25	49 45	49 25	49 30	49.30
13	49 60	49 45	49 10	51 30	[illegible]	48 75	49 35	49 25	49 25	[illegible]	49 30	49 45
14	49 20	49 30	50 80	51 00	50 20	48 90	49 20	49 40	49 00	49 25	49 25	49 30
15	48 75	50 45	50 90	50 75	50 15	49 05	49 20	49 20	49 30	49 35	49 10	49 20
16	48 80	52 25	51 00	50 70	50 00	49 15	49 15	49 25	49 20	49 30	49 50	49 45
17	48 45	50 60	50 40	50 45	50 10	48 85	49 25	49 30	[illegible]	49 30	[illegible]	49 30
18	48 50	50 65	50 05	50 20	49 85	48 45	49 30	49 15	49 35	49 10	[illegible]	49 45
19	49 10	50 25	49 95	50 80	49 45	48 65	49 15	49 20	[illegible]	49 20	49 35	49 15
20	48 25	50 15	50 00	50 35	49 65	49 05	49 15	49 10	49 15	49 20	[illegible]	48 95
21	48 35	49 85	49 90	50 20	49 90	49 30	49 15	48 90	48 70	49 35	49 40	49 35
22	48 45	50 20	50 30	50 00	[illegible]	49 15	49 30	49 40	48 70	49 35	49 15	49 00
23	48 25	50 30	50 10	49 85	49 65	48 95	49 25	49 20	48 85	49 20	49 20	49 20
24	47 95	49 75	50 65	49 85	50 10	48 60	49 20	49 30	48 65	49 30	49 25	49 25
25	48 10	49 40	50 55	50 15	49 60	48 40	49 40	49 25	49 20	49 40	49 10	49 15
26	49 05	49 25	49 85	50 65	49 35	49 35	49 15	49 15	49 20	49 35	49 30	49 25
27	49 20	49 25	50 35	51 05	49 40	49 35	49 35	49 30	49 25	49 30	49 20	49 00
28	48 10	50 00	50 85	51 40	49 30	49 15	49 10	49 35	49 15	49 35	49 20	49 20
29	49 25	49 85	52 00	51 40	49 15	49 15	49 00	49 10	49 30	49 45	49 00	49 00
30	49 05		51 90	51 50	49 50	49 25	49 15	49 15	49 30	49 25	49 40	49 15
31	49 30		51 75		49 40		49 30	49 25		49 35		49 10

Mean Daily Discharge of Hudson River at Hudson River Power Co.'s Dam near Mechanicville N. Y.

* Sundays.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River at Toll Bridge, Mechanicville, N. Y.

DAY.	Jan.	Feb.	March	.	Dec.
1908.					
1	51 87	50 17	5. [illegible]	17	49 87
2	51 62	50 27	51.2	17	49.27
3	51 27	50 42	51 0	17	49 47
4	51 42	50.32	51 0	37	49 62
5	41 22	49 87	50 1	37	49.[illegible]
6	51 22	49 72	50.2	12	48.82
7	51 02	49 82	49 7	12	49.02
8	50 97	49 72	50.0	12	49 47
9	50 47	49 77	49 9	12	49.52
10	50 37	50 02	50 4	.7	49 92
11	50.42	50 12	49 9	12	49 52
12	50 27	49 92	50 4	12	49 67
13	50 77	50 12	51 0	12	48.67
14	50 57	50 42	52.2	17	49 42
15	50 47	52 77	52 0	2	49 32
16	5‥ 52	54 17	52.1	12	49 47
17	50 32	52 72	51.7	7	49 47
18	50 17	52 82	51.8	17	49 62
19	49 97	52 02	51.1	17	49 47
20	50 52	51 42	51 0	7	48 97
21	50 12	50 72	50 8	17	49 22
22	49 87	51 42	51.0	12	49 17
23	49 97	52 .07	51 1	17	48 67
24	50 22	51 47	51 7	12	49 17
25	50 32	41 .07	51 9	12	49 07
26	50 27	50 77	51 5	7	49 52
27	50 57	50 67	51 9	12	48.62
28	50 42	51 67	52 8	12	49 57
29	50 37	50 92	53 5	2	49.12
30	50 37		54 0	17	49.07
31	50 22		53 9	.	49.02

HUDSON RIVER AT WEST VIRGINIA PULP AND PAPER CO.'S MILL, MECHANICVILLE, N. Y.

A record of the flow of Hudson river at Mechanicville has been kept at the Duncan dam since December, 1888. The record includes two daily readings of the depth on the crest of the dam, and a continuous record of the run of the water-wheels in the adjoining paper-mill. The accompanying tables, computed by Mr. R. P. Bloss, the engineer of the West Virginia Pulp and Paper Company, show the daily and monthly mean flow at Mechanicville.

The dam at Mechanicville was raised during 1904, a concrete crest and apron being added, so that the dam has now a rounded, or ogee profile. A discharge curve has been calculated, using coefficients of discharge derived from United States Geological Survey experiments on models of dams of ogee cross-section.

Water carried in Champlain canal, which parallels Hudson river from Fort Edward to Albany, is not included in the estimated discharge, but measurements of the discharge in the canal, made during 1908, are given herewith.

Mean Daily Discharge, Second-feet, of Hudson River at West Virginia Pulp and Paper Co.'s Dam at Mechanicville, N. Y.

* Sundays.

Monthly Discharge of Hudson River at West Virginia Pulp and Paper Co.'s Dam at Mechanicville, N. Y.

[Drainage area, 4,500 square miles.]

MONTH	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	18,006	2,689	8,383	1 86	2 13
February	28,259	3,207	9,692	2.15	2.32
March	32,768	6,358	14,047	3.12	3 58
April	34,335	15,451	22,297	4 95	5.54
May	31,969	6,423	17,944	3 99	4.59
June	9,168	1,767	3,757	0 835	0.935
July	3,250	1,480	2,141	0 476	0 547
August	2,265	1,280	1,769	0 393	0 452
September	1,591	673	1,023	0 227	0 254
October	2,304	1,038	1,380	0 307	0 353
November	3,718	454	1,861	0 414	0.464
December	3,863	557	2,012	0.447	0 514

Current-meter Discharge Measurements of Champlain Canal at Saratoga St., Mechanicville, N. Y.

DATE.	Hydrographer.	Gage height.a	Area of section.	Mean velocity.	Discharge.
		Feet.	*Square feet.*	*Ft. per second.*	*Second-feet.*
1908.					
Sept. 19...	Weeks and Patchke..................	1.46	238	0.368	87.7
Sept. 23. .	Weeks and Patchke........	1 52	238	0 367	87.3
Sept. 28...	Weeks and Patchke..................	1.54	240	0.330	79.3

a Reference point.

HUDSON RIVER AT B. & M. R. R. BRIDGE ABOVE MECHANICVILLE, N. Y.

This gage was established August 15, 1905, by this Department. The gage consists of a vertical board with painted tenth-foot marks reading from zero to 16 feet, and is attached to the down-stream end of the right-hand pier of the bridge. The gage datum is at elevation 66.50, and the gage is slightly inclined to conform with the batter of the pier. Readings are taken at 7 A. M. and 5 P. M. by W. B. Lebar. The gage is located about two-thirds mile up-stream from the Duncan dam.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River at B. & M. R. R. bridge above Mechanicville, N. Y.

HOOSIC RIVER.

DESCRIPTION.

Hoosic river has its sources on the west slope of the Hoosac mountains in Vermont and Massachusetts. Two head branches, one flowing southward, the other northward along the west slope of this range, unite at North Adams, Mass., and the stream then flows northwestward, entering the Hudson three miles north of Mechanicville. Above Buskirk the drainage basin is rugged and precipitous, the distribution of tributaries affording rapid concentration of the run-off from the steep rock slopes. The ridges are sparsely wooded. The soil in the valleys is generally firm and tenacious. The general elevation of the valley at the junction of the head waters is 1,000 feet. Numerous dams, affording power for textile, agricultural implement, and other industries, are scattered throughout the length of the stream from North Adams to Schaghticoke. The drainage basin contains no important lakes and but little storage in reservoirs.

HOOSIC RIVER AT SCHAGHTICOKE, N. Y.

This gage was established April 3, 1904, and is maintained by this Department in coöperation with the U. S. Weather Bureau. The gage is attached to the wall of the Empire Grist Mill at the right-hand end of the upper dam at Schaghticoke. It is in two sections, which are divided decimally from zero to 3 feet and 3 feet to 12 feet, respectively. Readings are taken by George W. Baldwin at 8 A. M. and 6 P. M. each day. Water is diverted to mills for power purposes at this dam and there is no direct relation between the discharge and the stage, as shown by the gage, except in times of extreme high water.

Mean Daily Gage Height, in Feet, of Hoosic River at Schaghticoke, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	1.10	.55	.80	1.55	2.00	1.45	.70	.30	.85	1.50	2.70	3.1
2	.95	.55	.85	1.45	1.90	1.15	.70	.20	1.00	1.25	2.80	2.7
3	.90	.60	.95	1.35	1.90	1.05	.65	.25	1.10	1.10	2.10	......
4	.85	.60	.85	1.05	1.85	.95	.60	.20	1.00	.20	3.05	4.05
5	.80	.65	.85	1.00	1.65	.80	.50	.25	.90	1.05	3.00	5.85
6	.90	.65	.95	1.10	1.65	.80	.50	.55	.80	1.00	2.25	6.50
7	.90	.65	.85	1.10	1.55	.80	.50	.35	.90	.85	2.50	6.95
8	.85	.65	.80	1.20	2.45	.80	.60	.20	.90	1.30	2.35	7.95
9	.80	.70	.80	2.05	2.10	.75	.65	*	.95	1.35	2.80	†1.00
10	.85	.75	.80	1.65	2.00	.75	.45	*	.85	1.35	2.95	1.00
11	.90	.80	.90	1.60	1.85	.70	.30	*	.85	.60	2.70	1.00
12	.90	.80	1.20	1.40	1.80	.70	.30	*	.85	.90	2.85	—.35
13	2.20	.80	1.45	1.30	1.75	.65	.35	*	.75	.90	3.15	—.50
14	1.20	.85	2.05	1.25	1.85	.60	.05	*	.85	1.30	3.10	.55
15	.90	2.60	1.75	1.10	1.95	.65	.20	*	.85	2.25	2.65	—.55
16	.90	2.35	1.70	1.75	1.75	1.60	.20	*	.90	1.70	4.35	—.45
17	.85	1.35	1.20	1.40	1.70	1.20	.35	*	.80	1.90	3.00	—.35
18	.80	1.00	.90	1.35	1.55	.90	.20	*	.90	1.50	3.05	—.45
19	.70	.85	.85	1.70	1.40	.75	.60	*	.85	1.80	2.60	—.55
20	.70	.80	.90	1.55	1.30	.70	.55	*	.70	2.40	3.05	.90
21	.70	.85	.90	1.30	1.25	.70	.35	*	.60	1.60	3.00	1.70
22	.75	.90	.95	1.20	1.25	.65	.50	*	.60	2.30	3.70	—.45
23	.90	.90	1.05	1.25	1.45	.45	1.10	*	.70	2.20	3.50	—1.70
24	.75	.85	1.65	1.60	1.20	.35	.85	*	.75	2.25	3.35	—3.15
25	.65	.80	1.70	1.60	1.20	1.05	1.25	*	.45	1.10	3.60	—3.60
26	.60	.75	1.65	1.70	1.15	.95	1.65	1.30	.10	2.80	4.10	—1.35
27	.85	.85	1.80	1.65	1.20	.85	1.05	1.20	—1.35	1.80	6.35	—1.40
28	.90	.95	2.25	1.70	1.10	.70	.75	1.15	1.60	2.40	2.75	—3.35
29	.85	.85	2.50	1.75	1.00	.65	.80	1.10	.15	3.10	2.60	—4.10
30	.75	......	2.10	1.70	1.05	.70	.60	1.10	1.10	3.20	3.50	—3.70
31	.65	......	1.65	......	1.40	......	.25	.95	......	3.05	......	—1.25

* Water shut off from gage.
† Readings from this date, taken from gage in new location.

HOOSIC RIVER AT BUSKIRK, N. Y.

A gaging station was established September 25, 1903, at the highway bridge in Buskirk village by Robert E. Horton, for the U. S. Geological Survey, by which it has since been maintained in coöperation with this Department. The channel is straight near the gaging station. The banks are high and seldom overflow. The current is exceptionally smooth, but is rather slow during low water. A standard chain gage is attached to the covered wooden highway bridge. The length of the chain is 28.17 feet. The gage is read twice each day by Bert C. Henry. A bench-mark is located on the up-stream corner of the left abutment; elevation, 36.03 feet above gage datum.

Mean Daily Gage Height, in Feet, of Hoosic River at Buskirk, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	3.5	3.55	2.8	4.1	4.65	3.15	1.8	1.85	1.8	1.65	1.5	1.5
2	3.3	3.45	2.9	4.0	4.05	2.75	1.8	1.8	1.75	1.5	1.5	1.4
3	3.15	3.2	3.1	3.6	4.05	2.55	1.75	1.55	1.65	1.45	1.55	1.45
4	2.85	3.35	2.7	3.05	3.9	2.35	1.7	1.75	1.5	1.6	1.65	1.5
5	2.8	3.15	2.55	2.95	3.55	2.2	1.7	1.9	1.6	1.5	1.5	1.5
6	2.65	3.15	2.45	3.15	3.8	2.05	1.9	3.0	1.45	1.6	1.45	1.4
7	2.85	3.3	2.5	3.4	3.35	2.1	1.8	2.3	1.5	1.6	1.55	1.55
8	3.05	3.35	2.25	3.7	5.65	2.1	1.65	2.3	1.6	1.55	1.5	2.35
9	2.95	3.1	2.5	5.5	6.2	2.1	1.75	2.0	1.55	1.5	1.45	2.1
10	2.9	3.15	2.35	4.4	5.15	2.1	1.6	1.85	1.65	1.5	1.6	2.95
11	2.7	3.2	2.5	4.3	4.4	1.95	1.9	1.85	1.6	1.6	1.5	2.8
12	2.85	3.25	4.35	4 05	3.9	1.95	1.5	1.85	1.5	1.5	1.6	2.9
13	5.3	3.25	4.9	3.85	3.6	2.0	1.6	1.9	1.45	1.5	1.55	2.65
14	3.75	3.55	6.1	3.55	4.05	1.9	1.75	1.8	1.45	1.55	1.5	2.5
15	3.05	10.9	4.6	3.6	4.05	1.9	1.8	1.85	1.45	1.4	1.5	2.65
16	2.9	7.55	5.15	4.85	3.6	3.35	1.75	1.85	1.55	1.5	1.6	2.55
17	2.75	4.2	8.6	3.9	3.3	2.65	1.75	1.95	1.6	1.55	1.6	2.0
18	2 75	3.35	3.35	3.7	3.25	2.25	1.7	3.1	1.5	1.4	1.7	1.95
19	2.7	3.1	3.1	4.8	3.05	2.05	1.9	2.3	1.5	1.35	1.65	2.0
20	2.4	3.0	2.9	4.3	2.85	2.05	1.85	2.1	1.3	1.5	1.6	2.05
21	2.55	2.85	2.65	3.9	2.8	1.9	1.75	1.95	1.25	1.45	1.65	2.25
22	2.65	3.0	2.8	3.65	2.9	1.8	2.3	1.95	1.55	1.3	1.5	2.05
23	2.8	2.65	3.0	3.55	2.35	1.95	2.4	2.0	1.55	1.4	1.55	2.05
24	2.4	2.7	5.7	3.7	2.7	1.95	1.95	1.95	1.35	1.35	1.6	2.1
25	2.6	2.75	4.55	3.65	2.75	2.65	3.0	1.95	1.3	1.3	1.7	2.05
26	2.75	2.65	3.85	4.05	2.7	2.3	3.0	1.85	1.4	1.25	1.65	2.1
27	2.7	3.0	5 35	3.7	2.85	2.0	2.35	1.85	1.35	1.5	1.55	2.05
28	2.7	2.75	5.85	4.6	2.6	1.9	1.95	1.75	1.25	1.7	1.5	2.15
29	2.65	2.5	6 9	3.9	2.4	1.75	1.9	1.8	1.5	1.75	1.4	2.25
30	3.45	.....	5.55	3.65	2.8	1.85	1.85	1.75	1.55	1.8	1.6	2.15
31	3.5	.....	4.6	....	3.6	.....	1.85	1.5	.....	1.7	.....	2.2

NOTE.— Ice conditions prevailed from about January 30 to February 15 and Dec. 4 to 31.

Current-meter Discharge Measurements of Hoosic River at Buskirk, N. Y.

DATE.	Hydrographer.	Width.	Area of section.	Gage height.	Discharge.
1908.		*Feet.*	*Square feet.*	*Feet.*	*Second-feet.*
Jan. 20	Wood and Pierson	112	428	2.46	700
Feb. 28	D. M. Wood	125	473	2.71	822
May 4	D. M. Wood	132	612	3.84	1,830
Aug. 8	Brett and Allen	128	444	2.30	610
Sept. 21*a*	D. M. Wood	51	49.9	1.30	85.9
Oct. 28	Wood and French	121	376	1.80	239
Dec. 30*b*	D. M. Wood	108	188	1.92	87.8

a Measurement made by wading. *b* Measurement made under ice conditions about 200 feet below the bridge. Average thickness of ice, 0.8 foot; gage height to top of ice, 2.02 feet; some anchor ice.

Rating Table for Hoosic River at Buskirk, N. Y., from September 25, 1903, to December 31, 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
1.20	74	2.40	642	3.60	1,614	4.80	2,985
1.30	106	2.50	704	3.70	1,716	4.90	3,110
1.40	140	2.60	769	3.80	1,822	5.00	3,240
1.50	176	2.70	837	3.90	1,930	5.50	3,905
1.60	216	2.80	909	4.00	2,040	6.00	4,600
1.70	260	2.90	985	4.10	2,150	7.00	6,080
1.80	308	3.00	1,065	4.20	2,265	8.00	7,630
1.90	359	3.10	1,149	4.30	2,380	9.00	9,230
2.00	412	3.20	1,236	4.40	2,495	10.00	10,880
2.10	467	3.30	1,326	4.50	2,615		
2.20	524	3.40	1,419	4.60	2,735		
2.30	582	3.50	1,515	4.70	2,860		

The above table is applicable only for open-channel conditions. It is based on discharge measurements made during 1903–1908. It is fairly well defined between gage heights 1.6 feet and 7 feet.

Mean Daily Discharge, Second-feet, of Hoosic River at Buskirk, N. Y.

DAY.	Jan.	Feb.	Mar	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.										
1	1,520		5	1,190	308	333	308	238	176	176
2	1 330	...	9	873	308	308	284	176	176	140
3	1,190		1,1	738	284	196	238	158	196	158
4	947		8	612	260	284	176	216	238	176
5	909		7	524	260	359	216	176	176	.....
6	803		6	439	359	1,060	158	216	158	.....
7	[illegible]		7	467	308	582	176	216	196	.....
8	[illegible]		6	467	238	582	216	196	176	.....
9	[illegible]		7	467	284	412	196	176	158	.....
10			6	467	216	333	238	176	216	.....
11			7	385	359	335	216	216	176	.....
12			2,4	385	176	332	176	176	216	.....
13	[illegible]		3,1	412	216	359	158	176	196	.....
14	[illegible]		4,7	359	284	308	158	196	176	.....
15	[illegible]	a6,000	2,7	359	308	333	158	140	176	.....
16		6,930	3,4	1,370	284	332	196	176	216	.....
17		2,260	1,6	803	284	385	216	196	216	.....
18		1,370	1,3	553	260	1,150	176	140	260	.....
19		1,150	1,1	439	359	582	176	123	238	.....
20		1,060	9	439	333	467	106	176	216	.....
21		947	8	359	284	385	90	158	238	.....
22		1,060	9	308	582	385	196	106	176	.....
23		803	1,0	385	642	412	196	140	196	.....
24		837	4 1	385	385	385	123	123	216	.....
25		873	2,6	803	1,060	385	106	106	260	.....
26		803	1,8	582	1,060	333	140	90	238	.....
27		1,060	3,7	412	612	333	123	176	196	.....
28		873	4 3	359	385	284	90	260	176	.....
29		704	5 9	284	359	308	176	284	140	.....
30			3,9	333	332	284	196	308	216	.....
31			2,7		332	176		260		.....

a Ice conditions; discharge estimated

Monthly Discharge of Hoosic River at Buskirk, N. Y.

[Drainage area, 579 square miles.]

MONTH	Discharge in Second-feet			Run-off	
	Maximum.	Minimum.	Mean.	Second-feet per square mile	Depth in inches.
1908.					
January	3,640		1,030	1 78	2 05
February	6,930		1,120	1 93	2 08
March	5,930	553	2 000	3 45	3 98
April	3 900	1,020	1,960	3 39	3 78
May	4,890	612	1,680	2 90	3 34
June	1,370	284	532	919	1 03
July	1,060	176	378	653	75
August	1,150	176	410	708	82
September	308	90	179	309	34
October	308	90	183	.316	36
November	260	140	200	345	38
December			130	225	26
The year	6,930	90	817	1 41	19 17

NOTE.—Discharge during the frozen periods estimated partly on the basis of Kinderhook creek at Rossman

Discharge Jan. 30 to 31, 650 second-feet; Discharge Feb. 1 to 14, 400 second-feet; Discharge Feb. 15, 6,000 second-feet; Discharge Dec 5 to 31, 125 second-feet.

HOOSIC RIVER AT HOOSICK FALLS, N. Y.

This gage was established April 3, 1904, and is maintained by this Department in coöperation with the U. S. Weather Bureau. The gage, which is vertical, has painted tenth-foot marks and reads from 7 to 15 feet, and is attached to the partition wall of the head gate chamber of the factory of Walter A. Wood & Co. at the left-hand end of the dam, and a short distance up-stream from the crest line. Readings are taken by Sanford L. Cluett at 7 A. M. and 5 P. M. each day. The 7-foot mark of the gage is at elevation 410.04, B. & M. R. R. datum. It is referred to a copper plug at elevation 419.61, B. & M. R. R. datum, in the wall coping at the up-stream side of the head gate chamber. In low stages of the stream a large portion of the flow above this dam is diverted to the power-plant and there is no direct relation between the discharge and gage reading at such times.

Mean Daily Gage Height, in Feet, of Hoosic River at Hoosick Falls, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	.85	.50	.60	1 00	.95	.60	.15	.10	.10	—.45	.15	—.45
2	.75	.50	.65	.95	.95	.50	.05	.05	.0	—.45	—.45	—.45
3	.60	.35	.50	.80	1.00	.40	.05	.05	.0	—.45	—.45	—.45
4	.70	.20	.45	.70	.80	.35	.20	.00	—.05	.05	—.45	—.45
5	.75	.20	.40	.80	.70	.35	.20	.10	—.20	—.45	—.45	—.45
6	.65	.20	.40	.70	.70	.20	.10	.70	.05	—.45	—.45	.10
7	45	.20	.40	.75	.70	.30	.10	.40	.05	—.45	—.45	—.45
8	.80	.20	.50	.85	1.60	.20	.05	.20	—1.00	—.45	.05	.35
9	.70	.30	.45	1.40	1.60	.25	.05	.20	.0	—.45	—.45	.15
10	.55	.30	.35	1.15	1.40	.25	.05	.20	—.95	—.45	—.45	.15
11	65	.15	.40	1 10	1.10	.25	.05	.15	—.95	.05	—.45	—.40
12	.85	.15	.90	1.00	.80	.15	.10	.05	—.60	—1.00	—.40	—.05
13	1 90	.20	.95	.90	80	.15	—.45	.05	.10	—.45	—.45	.15
14	1.80	.45	1.70	.75	.85	.20	—.45	.05	—.45	—.45	—.45	.45
15	1.05	3.50	1.40	.75	1.00	.15	—.45	—.10	—.55	—.45	.0	.20
16	1.15	2.40	1.55	1 25	.80	.60	—.45	.10	—.95	—.45	—.5	.10
17	1.05	1.20	1.05	.90	.80	.45	—.25	—.05	—.60	—.45	—.45	.10
18	1.05	1.10	.75	.90	.70	.20	.10	.40	—.65	.0	—.45	.20
19	1.05	.70	.70	1.15	.50	.20	.30	.30	—.45	—.50	—.45	.10
20	.60	.80	.55	1.00	.50	.15	.20	.20	—.55	—.02	—.45	.10
21	.50	.75	.50	.85	.50	.20	.15	.10	—.45	—.45	—.45	—.45
22	.50	.65	.70	.80	.55	.15	.60	.15	—.45	—.45	—.05	—.40
23	.45	.60	.75	.70	.75	.15	.50	.20	—.45	—.45	—.50	—.45
24	.40	.50	1.65	.70	.70	.55	.45	.10	—.45	—.45	—.45	.10
25	.40	.50	1.20	.70	.65	.40	.60	.15	—.45	—.50	—.45	.15
26	.70	.55	1.00	.90	.45	.20	.50	.10	—.20	—.05	.10	.10
27	.70	.70	1.50	.80	.40	.20	.35	.15	.0	—.45	—.45	.05
28	.60	.60	1.60	.95	.40	.30	.25	.15	—.50	—.45	—.45	—.45
29	.60	.50	1.90	.80	.35	.10	.25	.10	—.45	.50	.05	.10
30	.40	......	1.50	.70	.45	.10	.20	.10	.45	—.40	.05	.05
31	.25	......	1.15	......	.70	......	.15	.05	......	—.40	......	.05

HUDSON RIVER AT STILLWATER, N. Y.

A gage was established at the highway bridge crossing the Hudson river at Stillwater and a record was begun December 28,

1907. Readings are taken each morning by Thomas E. Hickey. The gage is located a short distance above the dam and is also about one mile above the junction of Hoosic river with Hudson river.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River at Stillwater, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	86.29	84.49	84.99	87.79	88.09	84.69	84.09	84.64	84.49	84.34	84.89	85.24
2	86.29	84.39	85.04	87.34	88.54	85.29	84.04	84.19	84.49	84.69	84.79	85.04
3	86.19	84.29	85.09	87.14	88.64	85.19	83.89	84.64	84.39	84.79	84.84	84.94
4	85.99	84.29	85.09	86.74	88.44	85.10	83.79	84.74	84.04	84.69	84.89	84.84
5	85.79	84.39	85.09	86.54	88.09	85.14	83.79	84.69	83.84	84.69	84.84	84.89
6	85.79	84.49	84.99	86.29	87.44	84.89	84.19	84.69	83.74	84.74	84.69	84.74
7	85.19	84.49	85.09	86.29	87.39	84.74	84.19	84.79	83.69	84.79	84.54	84.69
8	85.09	84.59	85.04	86.54	87.09	84.64	84.09	84.79	83.64	84.79	84.24	84.59
9	85.19	84.49	85.09	87.44	87.29	84.69	84.14	84.69	83.69	84.79	84.49	84.59
10	85.69	84.29	85.09	87.69	87.29	84.64	84.09	84.69	83.94	84.69	84.44	84.54
11	84.99	84.69	85.04	87.74	87.24	84.54	84.14	84.69	84.39	84.29	84.34	34.69
12	84.89	84.59	85.19	87.79	87.04	84.34	83.99	84.64	84.54	83.99	84.59	84.79
13	85.09	84.69	85.54	87.74	86.79	84.24	83.89	84.64	84.49	84.09	84.49	84.69
14	85.09	84.79	86.14	87.39	86.94	84.09	84.09	84.69	84.39	84.24	84.49	84.79
15	84.89	85.74	86.24	87.14	86.84	84.14	83.99	84.69	83.94	84.49	84.44	84.89
16	84.89	86.99	86.29	86.94	86.69	84.74	83.94	84.54	83.59	84.44	84.64	84.84
17	84.79	86.84	86.14	86.89	86.54	84.64	83.84	84.64	83.24	84.54	85.04	84.79
18	84.89	86.64	85.99	86.79	86.39	84.44	83.79	84.79	82.94	84.59	84.84	84.69
19	84.79	86.24	85.89	86.74	86.09	84.34	83.59	84.84	82.79	84.59	84.84	84.69
20	84.69	86.09	85.79	86.74	86.04	84.24	83.64	84.89	82.79	84.59	84.79	84.69
21	84.69	85.89	85.69	86.54	85.94	84.14	84.09	84.89	83.39	84.59	84.79	84.59
22	84.79	85.89	85.64	86.29	85.89	84.49	84.39	84.84	83.84	84.54	84.79	84.59
23	84.79	85.74	85.79	86.24	86.09	84.39	84.29	84.64	84.19	84.54	84.74	84.59
24	84.79	85.59	86.04	86.24	86.09	84.24	84.79	84.84	84.19	84.59	84.64	84.59
25	84.69	85.39	86.19	86.54	85.89	84.24	84.79	84.84	84.29	84.59	84.84	84.49
26	84.49	85.39	86.14	87.04	85.64	84.24	84.69	84.79	84.19	84.54	85.09	84.49
27	84.69	85.29	86.24	87.59	85.49	84.04	84.69	84.79	84.09	84.59	85.09	84.49
28	84.89	85.29	86.79	88.29	85.49	83.99	84.69	84.74	84.04	84.69	85.09	84.59
29	84.79	85.14	87.44	88.54	85.29	84.09	84.54	84.69	84.09	84.99	85.14	84.69
30	84.69	......	88.14	88.49	85.19	84.14	84.5[illegible]	84.54	84.24	84.94	85.24	84.69
31	84.59	......	88.19	......	85.14	......	84.69	84.64	......	84.89	......	84.74

FISH CREEK.

DESCRIPTION.

Fish creek forms the outlet of Saratoga lake and is 8 miles in length, below the lake. It enters Hudson river at Schuylerville, at which point water power is developed. The stream descends 100 feet in the lower 4 miles of its course, the greater portion of this fall being concentrated at Victory Mills.

The drainage basin of Saratoga lake lies mostly to the north and west of the lake and is chiefly tributary through Kayaderosseras creek. This stream drains a highland region, having its sources in a range of hills which rise about 800 feet above the general plateau and run in a northwesterly and southeasterly direction. On the main plateau the topography is moderately rolling, tributaries rather sparse and soil sandy, with few marsh or lake areas.

Drainage Areas of Fish Creek. a

LOCATION.	AREA IN SQUARE MILES.	
	Place to place.	Total.
Kayaderosseras creek above Middle Grove	43.8	43.8
Kayaderosseras creek, Middle Grove to Ballston Spa	65.8	109.6
Kayaderosseras creek, Ballston Spa to mouth	85.1	194.7
Saratoga lake, water-surface	6.8	....
Total direct drainage into Saratoga lake b	41.1	235.8

a From Saratoga, Schuylerville, Schenectady, Glens Falls, Luzerne and Broadalbin sheets of the United States Geological Survey topographic atlas.
b Above Brandt's bridge.

FISH CREEK AT BURGOYNE, N. Y.

A temporary gage was attached to the right-hand abutment of Brandt's bridge at Burgoyne station, August 25, 1904, and gage readings continued until June 30, 1905. The station was reëstablished as a temporary station on August 28, 1908, by George M. Brett and a new gage placed on the face of the left bridge abutment near the up-stream edge. This gage has been read twice daily by Frank E. Ward, and is referred to the following benchmark: A crow's-foot chisel mark on outside, up-stream, lower chord, 0.3 foot from left abutment directly above gage; elevation 11.61 feet above gage datum.

Mean Daily Gage Height, in Feet, of Fish Creek at Burgoyne, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	0.85	0.65	1.25	0.95
2	......	.85	.65	1.1	1.0
3	......	.85	.65	1.05	.95
4	......	.95	.75	1.0	.85
5	......	.95	.55	1.0	.85
6	......	.95	.55	1.0	1.0
7	......	.9	.55	1.0	.9
8	......	.85	.55	1.1	1.0
9	......	.85	.55	.85	.95
10	......	.85	.55	.8	.85
11	......	.85	.9	.85	.95
12	......	.8	.7	.95	1.0
13	......	.75	.6	.95	1.2
14	......	.8	.65	.85	1.1
15	......	.75	.65	1.1	1.0
16	......	.75	.65	.9	1.0
17	......	.75	.65	.85	1.1
18	......	.75	.8	.85	1.0
19	......	.55	.7	.85	1.0
20	......	.6	.65	.85	1.2
21	......	.6	.65	.85	1.1
22	......	.6	.65	1.1	1.0
23	......	.6	.65	.9	1.0
24	......	.55	.65	.9	....
25	......	.55	.75	.9	....
26	......	.6	.75	1.1	....
27	......	.75	.75	.95	....
28	0.9	.6	.9	.95	....
29	.95	.65	.95	1.1	....
30	.9	.65	.95	.9	....
31	.85	......	1.05	......	....

Mean Daily Discharge, Second-feet, of Fish Creek at Burgoyne, N. Y.

DAY.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.					
1	......	102	70	197	122
2	......	102	70	157	133
3	......	102	70	145	122
4	......	122	85	133	102
5	......	122	57	133	102
6	......	122	57	133	133
7	......	112	57	133	112
8	......	102	57	157	133
9	......	102	57	102	122
10	......	102	57	93	102
11	......	102	112	102	122
12	......	93	77	122	133
13	......	85	63	122	183
14	......	93	70	102	157
15	......	85	70	157	133
16	......	85	70	112	133
17	......	85	70	102	157
18	......	85	93	102	133
19	......	57	77	102	133
20	......	63	70	102	183
21	......	63	70	102	157
22	......	63	70	157	133
23	......	63	70	112	133
24	......	57	70	112	....
25	......	57	85	112	....
26	......	63	85	157	....
27	......	85	85	122	....
28	112	63	112	122	....
29	122	70	122	157	....
30	112	70	122	112	....
31	102	......	145	......	....

Current-meter Discharge Measurements of Fish Creek at Burgoyne, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
1908.		*Feet.*	*Feet.*	*Square feet.*	*Second-feet.*
Aug. 28...	Geo. M. Brett	0.87	82.5	183	88.4
Sept. 22...	C. R. Adams	0.60	83	171	66.9
Oct. 29...	C. R. Adams	0.92	83	197	128

Rating Table for Fish Creek at Burgoyne, N. Y.

GAGE HEIGHT.	Discharge.
Feet.	*Second-feet.*
0.50	51
0.60	63
0.70	77
0.80	93
0.90	112
1.00	133
1.10	157
1.20	183

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on three discharge measurements made during 1908 and is only approximate.

Monthly Discharge of Fish Creek at Burgoyne, N. Y.
[Drainage area, 236 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
September	122	57	88 0	.373	.42
October	145	57	78 9	.334	.39
November	197	93	126	534	.60
December 1-23	183	102	134	568	.49

Hudson River at Schuylerville, N. Y.

This gage, which was established August 14, 1905, is located on the down-stream end of the fourth pier from the right-hand bank of Ferry street bridge at Schuylerville. The gage, which has painted tenth-foot marks, reads from zero to 16 feet. The zero mark is at elevation 81.50. Readings are taken at 8 A. M. and 5 P. M. by Walter Curtis. The river is divided by an island at the point where the bridge crosses. The gage is located on the right-hand channel near the island.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River at Schuylerville, N. Y.

DAY.	Dec.
1908.	
1	85 45
2	85 35
3	85 30
4	85.05
5	84 95
6	84.80
7	84 85
8	84 90
9	84 80
10	84 85
11	84 95
12	85 10
13	84 90
14	85 05
15	85 00
16	84 90
17	84.80
18	84.95
19	85.25
20	85.10
21	85.30
22	85.30
23	85.10
24	85.10
25	85.10
26	85 10
27	85.00
28	85.00
29	84.90
30	84.95
31	84.90

* No record.

HUDSON RIVER AT FREE BRIDGE, NEAR LIBERTY MILLS.

A meter gaging station was established at the highway bridge over the Hudson river near Liberty Mills, October 23, 1905, by C. A. Poole.

This bridge, which is commonly known as "Free Bridge," is about three-quarters of a mile south of the State dam at Northumberland and about one-quarter of a mile north of the mouth of the Batten kill. The entire yield of the watershed passes the station, except that diverted at the dam at Northumberland for the supply of the Champlain canal, and that passing northerly from Glens Falls feeder.

The gage is of the weight-and-chain type, and is attached to the lower chord of the north truss of the east span at first panel point from pier.

The datum to which all gage readings are added is 83.12, which is the elevation of bottom of weight when the end of chain is opposite the zero of the gage. Observations of the stage of the stream are taken twice each day by Wm. Dunstan.

Current-meter measurements were made by C. A. Poole in 1905 and 1906 from the bridge, which consists of three spans, with a total length of 426.2 feet between abutments.

The river channel is partly of rock and partly of gravel and of uniform cross-section under the bridge. About 400 feet below the bridge are rapids. The channel is straight for several hundred feet below the bridge to a point where the stream is divided by an island. Above the bridge the river bends slightly to the south. The current is somewhat sluggish during low water.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River near Liberty Mills.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	89.40	85.65	86.70	92.55	93.65	86.85	84.50	84.70	84.50	84.35	85.02	85.22
2	89.15	85.50	87.60	92.10	94.25	86.60	84.25	84.70	84.35	84.85	84.92	85.22
3	88.80	85.95	87.55	91.25	94.40	86.45	84.45	84.90	84.10	85.00	85.02	84.97
4	88.20	86.15	87.45	90.25	93.65	86.20	84.05	84.75	84.10	84.90	84.52	85.02
5	88.00	86.15	87.25	89.60	92.60	85.90	84.30	84.60	83.80	84.70	84.62	84.92
6	87.60	86.30	86.85	89.20	91.60	85.50	84.95	84.75	83.90	84.90	84.92	84.92
7	87.15	86.35	87.00	89.30	91.25	84.80	84.75	85.05	83.60	84.80	84.62	84.92
8	87.40	86.45	86.50	89.85	91.25	85.60	84.70	84.75	83.55	84.85	84.57	84.82
9	87.20	85.95	87.20	91.60	92.00	85.50	84.85	84.70	83.80	84.60	84.52	84.92
10	87.50	85.95	86.95	92.45	91.90	85.25	84.55	84.80	84.05	84.60	84.42	84.82
11	87.10	86.65	86.90	92.45	91.40	85.25	84.70	84.75	84.50	84.60	84.32	85.02
12	86.95	86.50	87.25	92.70	90.60	85.20	83.95	84.60	84.35	84.90	84.52	85.17
13	87.05	86.40	87.95	92.45	90.15	85.10	84.75	84.80	84.30	84.00	84.42	85.12
14	87.00	86.35	89.65	91.80	90.55	84.85	84.65	84.85	84.10	84.10	84.42	85.07
15	86.80	89.35	89.00	91.05	90.75	85.60	84.45	84.80	84.00	84.20	84.57	85.12
16	86.70	92.15	89.20	90.65	90.25	85.55	84.45	84.80	83.60	84.57	85.02	85.22
17	86.60	92.15	88.80	90.40	89.75	85.50	84.35	84.80	83.40	84.57	85.12	84.97
18	86.60	91.85	88.45	90.00	89.30	85.20	84.55	85.05	83.50	84.12	85.12	85.12
19	86.45	90.75	88.25	90.00	88.50	85.10	83.95	85.00	83.20	84.12	84.92	85.12
20	86.40	90.60	88.10	90.15	88.50	84.95	84.45	84.95	83.30	84.47	84.97	85.02
21	86.10	90.30	87.95	89.95	88.30	84.20	84.90	85.05	83.50	84.42	84.82	84.67
22	86.00	89.85	87.90	89.55	88.25	84.75	85.20	85.05	83.85	84.47	84.62	84.97
23	86.20	89.10	88.00	89.15	88.05	85.25	84.85	84.75	84.10	84.52	84.62	85.07
24	86.50	88.95	88.65	89.50	88.00	84.85	84.90	84.95	84.20	84.42	85.02	85.12
25	86.50	88.60	89.00	90.10	88.05	84.95	85.20	84.90	84.20	84.32	84.92	84.82
26	85.90	88.40	89.00	91.00	87.50	84.90	84.80	84.90	84.20	84.32	84.62	84.82
27	86.55	88.00	89.45	92.35	87.20	84.55	84.90	84.75	84.05	84.47	84.52	84.92
28	86.35	87.75	90.10	93.80	86.95	83.90	84.65	84.80	83.95	84.57	84.62	84.82
29	86.70	87.65	92.40	94.20	86.80	84.50	84.60	84.85	84.10	85.57	85.32	84.82
30	86.20	......	93.10	93.90	86.40	84.75	84.80	84.50	84.00	85.02	85.57	84 87
31	86.20	...	93.30	......	86.50	.....	84.75	84.50	......	85.22	......	85.12

BATTEN KILL AT BATTENVILLE, N. Y.

A temporary low-water station was established here on September 24, 1908, by C. Robert Adams. It is at the covered highway bridge at Battenville just below the mill of the Phœnix Paper Company. The drainage area at this point is 392 square miles.

The channel is straight for about 200 feet above the station and for 400 feet or more down-stream. Both banks are high and not liable to overflow. The bed of the stream is of gravel and fairly permanent. There is one channel at all stages. The current is good at medium and high stages, but becomes sluggish at very low stages.

Discharge measurements are made from the down-stream side of the bridge, the initial point for soundings being the top of face of the right-hand abutment. At low water, measurements are made by wading at a point about 200 feet up-stream from the bridge, where there is a very good section.

A vertical staff gage, which is read twice daily by Mr. William R. Hobbie, president of the Phœnix Paper Company, is attached to the up-stream side of the right-hand abutment. It is referred to

a bench-mark as follows: Crow's-foot chiseled in top stone of up-stream right abutment and marked with red chalk; distance to 10-foot mark on gage, 7.53 feet.

Mean Daily Gage Height, in Feet, of Batten Kill at Battenville, N. Y.

DAY.	Sept.	Oct.	Nov.	Dec.
1908.				
1	......	5.81	5.85	5.85
2	......	5.78	5.96	5.77
3	......	5.84	5.89	5.78
4	......	5.82	5.86	5.73
5	......	5.95	5.86	5.78
6	......	5.83	5.95	5.89
7	......	5.78	5.82	5.91
8	......	5.76	5.84	6.60
9	......	5.74	5.88	......
10	......	5.78	5.86	......
11	......	5.85	5.78	......
12	......	6.06	5.87	......
13	......	5.94	6.11	......
14	......	5.94	5.90	......
15	......	5.89	5.88	......
16	......	5.86	6.00	......
17	......	5.84	5.90	......
18	......	5.82	5.87	......
19	......	5.82	5.82	......
20	......	5.84	5.82	......
21	......	5.88	5.90	......
22	......	5.81	5.90	......
23	5.77	5.82	5.88	......
24	......	5.80	5.87	......
25	5.73	5.73	5.92	......
26	5.78	5.70	6.05	......
27	5.60	5.74	6.14	......
28	5.74	5.80	6.04	......
29	5.76	5.91	6.06	......
30	5.79	6.02	5.98	......
31	......	5.95	......	......

NOTE.—River frozen December 9.

Current-meter Discharge Measurements of Batten Kill at Battenville, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
1908.		*Feet.*	*Feet.*	*Square feet.*	*Second-feet.*
Sept. 23	C. R. Adams	5.77	55	51.7	82.3
Oct. 28	C. R. Adams	5.80	57	60.6	108

NOTE.—Measurements made by wading.

HUDSON RIVER ABOVE DAM AT NORTHUMBERLAND, N. Y.

Champlain canal crosses the Hudson river in the pool formed by the State dam at Northumberland. The gage, which was established April 11, 1904, is located on the right-hand bank of the stream above Northumberland dam and about 200 feet down-stream from the towing bridge. The gage is a vertical scale with painted tenth-foot marks and is attached to the docking forming the towpath wall. Readings are taken at 8 A. M. and 5 P. M. by G. Hammond. The zero mark of the gage is at elevation 100.58.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Dam at Northumberland, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	105.83	102.68	104.13	106.58	107.23	104.43	102.03	102.53	102.43	102.38	104.23	103.78
2	105.58	103.88	103.93	106.48	107.33	104.28	102.23	102.98	102.43	102.43	103.28	103.53
3	105.43	103.43	103.88	106.03	107.63	104.18	102.83	102.93	102.23	102.53	102.43	102.83
4	105.58	103.28	103.68	105.78	107.18	104.13	104.03	102.48	102.38	103.13	102.33	102.78
5	105.08	103.63	103.88	105.18	106.53	104.08	103.93	102.48	102.58	102.83	102.38	102.33
6	104.68	103.78	103.58	104.93	106.03	103.98	103.78	102.53	102.43	102.63	102.33	102.28
7	104.38	103.78	103.73	104.78	105.93	104.18	102.33	102.48	102.58	102.48	102.38	102.43
8	104.08	103.88	103.88	104.98	105.83	104.18	102.38	102.63	102.58	102.38	103.08	102.38
9	103.93	103.93	103.73	106.08	105.98	103.48	102.18	103.28	102.58	102.43	102.28	102.23
10	104.48	103.93	103.58	106.43	106.03	103.93	104.03	103.28	102.53	102.33	102.38	102.03
11	104.18	104.23	103.73	106.53	104.93	102.73	104.43	102.53	102.38	103.08	102.38	102.33
12	104.38	103.58	103.98	106.73	105.43	103.63	104.03	102.48	102.58	102.88	102.33	102.83
13	104.03	103.63	104.63	105.78	105.58	103.28	102.28	102.48	102.43	102.38	102.38	102.88
14	103.98	103.60	105.08	105.43	105.18	103.43	102.48	102.48	102.33	102.38	103.13	102.63
15	103.63	104.53	105.18	105.28	105.28	104.23	102.28	102.53	102.23	102.28	102.68	102.43
16	103.83	105.83	105.03	105.08	105.43	104.13	102.23	102.53	102.33	102.28	102.48	102.48
17	103.58	106.03	104.98	105.38	105.43	103.98	102.28	103.28	102.33	102.33	102.58	103.03
18	103.73	105.93	104.83	105.23	104.98	103.48	104.18	102.83	102.38	103.18	102.43	102.73
19	104.03	105.73	104.78	105.13	104.88	102.78	103.48	102.48	102.68	102.63	102.23	103.23
20	103.58	105.68	104.73	104.98	104.33	102.78	103.63	102.48	102.43	102.28	101.88	103.23
21	103.63	105.43	104.83	104.93	104.23	103.88	103.78	102.53	102.33	102.28	101.88	101.98
22	103.68	104.68	104.98	105.08	104.23	103.98	102.83	102.48	102.33	102.38	101.18	102.28
23	103.68	104.38	104.78	105.28	104.08	103.48	102.58	103.38	102.33	102.48	101.93	102.43
24	103.83	104.28	104.88	106.08	104.58	103.18	102.58	103.23	102.33	102.93	101.68	102.38
25	103.68	104.33	104.68	106.58	104.28	103.08	103.38	102.38	102.28	102.88	102.13	102.78
26	103.98	104.23	104.53	107.08	104.03	102.83	103.08	102.53	102.58	102.78	102.48	101.43
27	103.88	104.23	104.88	107.28	103.98	102.33	102.23	102.43	102.33	102.53	102.53	102.38
28	103.78	104.08	105.23	107.28	104.13	103.73	102.48	102.43	102.38	103.13	103.13	102.38
29	103.23	104.08	106.33	107.13	104.28	103.58	102.58	102.43	102.38	103.48	103.33	101.98
30	104.18	.....	106.58	107.08	104.43	102.48	102.53	103.28	102.33	103.68	103.43	102.18
31	103.88	.....	106.93	.....	104.88	.....	102.53	103.58	102.33	103.73	.....	101.63

HUDSON RIVER AT HILL STREET BELOW FORT MILLER, N. Y.

A line of timber cribs crosses the Hudson river diagonally about one mile below Fort Miller dam. A gage was established at this point April 11, 1904, by J. A. O'Connor, for this Department. The gage is in two sections. The lower section is attached to the down-stream face of the second crib, located about 55 feet from the left-hand bank. The upper section is attached to the down-stream face of the crib nearest the left-hand bank. The gage zero is at elevation 100.50. Readings of this gage and of the gages below and above Fort Miller dam are taken each morning and afternoon by L. C. Brazier.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River at Hill St., below Fort Miller, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	107.00	104.15	105.05	108.15	109.10	105.55	103.05	103.40	103.15	103.35	105.00	104.20
2	106.90	104.65	105.05	107.95	109.30	105.50	103.30	104.45	103.05	103.35	104.10	104.30
3	106.65	104.35	104.90	107.35	109.60	105.50	103.40	104.10	103.00	103.40	103.20	103.75
4	106.30	104.30	105.05	106.65	108.70	105.30	104.90	103.35	103.10	104.45	103.20	103.65
5	106.50	104.55	105.05	106.35	108.35	105.15	104.90	103.30	103.30	103.70	103.20	103.25
6	105.85	104.30	104.90	106.25	107.50	105.05	104.45	103.35	103.40	103.20	103.25	103.25
7	105.80	104.80	105.00	106.30	107.20	105.05	103.25	103.35	103.40	103.40	103.35	103.60
8	105.55	104.70	105.10	106.75	107.20	105.00	103.30	103.30	103.35	103.25	103.15	103.25
9	105.45	105.00	105.05	108.15	107.70	104.10	103.30	104.35	103.20	103.30	103.35	103.30
10	105.35	104.65	105.00	108.45	107.70	104.45	103.90	103.95	103.40	103.25	103.25	103.30
11	105.15	104.65	105.00	108.60	107.30	104.50	104.95	103.40	103.35	103.50	103.25	103.30
12	105.25	104.55	104.95	108.65	106.85	104.75	105.00	103.25	103.25	103.60	103.20	103.60
13	105.10	104.50	105.30	108.45	106.70	103.85	104.70	103.35	103.40	103.30	103.20	103.60
14	105.10	104.70	105.95	108.10	107.00	104.15	103.30	103.35	103.15	103.25	103.20	103.40
15	105.10	105.70	106.25	106.90	107.00	105.10	103.40	103.30	103.25	103.20	104.25	103.70
16	104.85	107.20	106.40	106.40	106.75	104.83	103.00	104.45	103.20	103.10	104.40	103.75
17	104.75	107.50	106.35	105.95	106.65	104.40	103.05	103.80	103.15	103.20	104.05	103.30
18	104.70	107.60	106.25	105.55	106.10	104.40	103.10	103.40	103.20	103.95	103.65	103.70
19	104.75	107.45	106.15	105.80	105.65	103.50	104.55	103.40	103.20	103.60	103.30	103.30
20	104.65	107.35	106.15	105.90	105.60	103.40	104.20	103.25	103.40	103.20	103.20	104.05
21	104.40	107.10	106.05	106.20	105.60	104.50	104.20	103.40	103.20	103.20	102.80	102.65
22	104.95	106.45	106.10	106.25	105.50	104.80	104.40	103.35	103.35	103.15	101.95	103.20
23	105.20	106.55	106.00	106.20	105.40	104.30	103.85	104.35	103.25	103.10	103.10	103.20
24	105.10	105.90	106.10	106.30	106.05	103.55	103.40	103.80	103.35	103.25	103.25	103.10
25	104.85	105.75	106.10	106.85	105.50	103.60	103.50	103.30	103.30	104.30	102.85	104.40
26	105.20	105.60	106.05	107.40	105.25	103.60	104.60	103.30	103.35	103.55	103.05	102.50
27	105.20	105.40	106.35	108.25	105.15	103.20	104.00	103.25	103.30	103.10	103.30	103.35
28	104.75	106.25	106.80	109.05	105.25	104.55	103.30	103.55	103.25	103.10	104.30	102.70
29	104.65	106.20	108.15	109.35	105.40	104.20	103.50	103.40	103.25	104.75	103.95	102.45
30	104.75	......	108.55	109.10	105.25	103.45	103.45	104.30	103.25	103.50	104.80	102.60
31	104.80	......	108.80	......	105.75	......	103.70	103.70	......	104.15	......	103.05

HUDSON RIVER BELOW DAM AT FORT MILLER, N. Y.

This gage, which was established April 11, 1904, is attached to the face of the bulkhead wall below the Fort Miller Paper Co.'s mill. The gage is near the down-stream end of the wall and is divided decimally from zero to 8 feet. The zero mark is at elevation 104.08.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River below Dam at Fort Miller, N. Y.

DAY.
[illegible]
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HUDSON RIVER ABOVE DAM AT FORT MILLER, N. Y.

A gage was established in the pond above the Fort Miller dam April 11, 1904, by this Department. The gage is attached to the face of the line of ice breakers extending up-stream from the dam near the left-hand bank of the river. The gage is about 325 feet up-stream from the paper mill and is divided by painted tenth-foot marks from zero to 18 feet. The zero mark is at elevation 114.00. The crest of the dam is at elevation about 115.00 and is 639 feet long. Water is diverted for power purposes at the left-hand end of the dam. Power was formerly used at the right-hand end of the dam.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Dam at Fort Miller, N. Y.

DAY.
1908.
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HUDSON RIVER ABOVE CROCKER'S REEF DAM.

A gage was established above Crocker's Reef 450 feet up-stream from the head of Thompson's Island April 11, 1904, by J. A. O'Connor, for this Department. The reef has since been submerged by construction of a dam for the Barge canal. The gage is a painted scale subdivided to tenths of a foot from zero to 18 feet and is attached to the down-stream side of a large elm tree. The gage zero is at elevation 115.06. Readings are taken at 8 A. M. and 5 P. M. by Fred C. Bristol.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Crocker's Reef Dam.

DAY.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1904.									
1	......	122.5	117.1	115.9	116.3	116.3	118.1	117.2	115.8
2	......	122.3	117.1	116.8	116.1	116.3	118.2	117.1	115.9
3	......	122.1	116.7	117.3	115.9	116.3	118.1	116.9	116.0
4	......	122.0	116.5	117.4	115.9	116.3	117.5	116.9	116.1
5	......	121.4	116.1	117.1	116.1	115.9	117.4	116.7	115.7
6	......	120.9	116.1	117.4	116.2	116.1	117.1	116.7	115.8
7	......	120.6	117.4	117.3	116.7	116.5	116.9	116.5	115.7
8	......	119.6	117.3	117.5	116.7	116.5	116.5	116.5	116.0
9	......	119.7	119.0	117.5	116.5	116.5	116.6	116.3	115.9
10	......	119.5	119.1	115.9	116.7	116.3	116.6	116.3	116.0
11	123.7	119.1	119.0	116.2	116.1	116.3	116.9	116.2	116.2
12	123.2	118.7	119.0	116.7	116.1	116.5	117.3	116.4	116.1
13	122.7	118.1	118.6	116.7	116.1	116.4	117.4	116.3	116.0
14	121.8	117.9	117.9	116.1	116.0	116.5	117.2	116.2	115.9
15	120.9	117.5	117.6	116.3	116.0	116.7	117.0	116.1	116.0
16	120.2	117.8	117.3	116.3	115.9	116.5	116.7	116.1	116.0
17	119.7	118.5	117.1	116.1	115.8	116.4	116.6	116.0	116.0
18	119.5	118.6	116.9	116.1	115.4	116.1	116.5	116.1	115.8
19	119.3	118.3	117.1	116.7	115.7	116.7	116.5	115.9	115.4
20	119.1	118.9	117.1	116.3	115.8	116.4	116.6	116.1	116.1
21	118.7	118.7	117.5	115.9	115.9	116.4	117.1	116.1	116.0
22	118.6	118.7	117.2	115.7	116.0	116.4	120.4	116.0	115.8
23	118.5	118.9	117.4	115.5	118.0	116.4	121.3	115.9	115.7
24	118.6	118.3	117.4	115.2	117.9	116.5	120.9	115.6	115.9
25	118.0	118.0	117.6	115.6	117.3	116.5	120.0	115.2	116.0
26	119.9	118.1	115.7	115.6	117.1	117.0	119.1	116.2	116.0
27	120.3	118.0	117.7	115.4	116.7	117.3	118.0	116.3	116.2
28	120.7	118.3	116.1	115.4	116.4	117.3	118.1	115.8	116.8
29	121.8	117.3	115.7	116.1	116.3	117.2	117.8	116.3	116.9
30	122.3	117.7	115.5	115.9	116.4	117.5	117.6	116.2	116.7
31	......	117.3	......	116.1	116.4	......	117.4	......	116.7

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Crocker's Reef Dam.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.												
1	116.8	116.3	116.3	124.7	118.7	116.3	118.0	117.6	115.6	116.8	116.4	116.8
2	116.9	116.2	116.4	122.8	118.4	116.5	118.0	117.8	116.0	116.7	116.5	116.7
3	116.7	116.2	116.3	121.9	118.3	116.4	119.3	117.3	116.5	116.5	117.1	117.4
4	116.7	116.2	116.2	121.4	118.6	116.2	119.8	117.4	118.2	116.4	117.2	118.0
5	116.6	116.3	116.1	121.3	118.6	116.3	119.7	116.9	119.8	116.5	117.1	117.6
6	116.5	116.2	116.1	121.9	118.1	116.2	119.1	116.5	120.3	116.2	117.2	117.6
7	116.7	116.3	116.4	122.1	117.8	116.3	118.9	116.8	120.0	116.1	117.3	117.5
8	117.0	116.4	116.4	121.4	117.8	116.5	119.3	116.3	119.5	116.0	117.6	117.3
9	116.8	116.3	116.3	120.6	118.0	117.8	117.8	116.5	119.0	116.5	117.6	117.1
10	116.6	116.5	116.3	119.9	117.8	119.2	118.1	116.3	118.4	116.2	117.5	117.0
11	116.6	116.3	116.3	119.6	117.7	118.3	117.4	116.2	118.0	116.2	117.3	116.8
12	116.7	116.2	116.1	120.3	117.5	118.0	116.9	116.0	117.8	116.3	117.0	116.5
13	116.7	116.1	115.9	120.4	117.3	117.7	116.7	116.1	117.8	116.2	116.9	116.5
14	116.6	116.4	116.1	120.4	117.3	117.4	116.8	116.1	117.7	117.1	116.9	116.5
15	116.5	116.5	116.2	120.3	117.4	117.3	116.6	116.2	116.8	117.0	116.9	116.5
16	116.4	116.5	116.1	120.2	116.9	117.2	116.5	116.5	116.9	116.8	116.7	116.6
17	116.4	116.3	116.3	119.5	117.6	116.8	116.5	117.0	116.9	116.7	116.6	115.8
18	116.4	116.4	116.2	119.1	117.3	118.1	116.4	116.9	117.2	116.7	116.5	115.7
19	116.4	116.0	116.0	118.4	117.0	118.5	116.5	116.7	117.7	116.5	116.3	116.1
20	116.5	115.6	116.7	118.0	117.0	118.5	116.6	116.6	118.6	116.6	116.5	115.9
21	116.4	116.5	117.2	118.1	117.0	118.5	116.6	116.4	119.0	117.0	116.3	116.2
22	116.5	116.4	117.4	119.0	117.4	119.5	116.5	116.1	119.4	117.3	116.1	116.2
23	116.4	116.3	117.6	119.9	117.4	119.6	116.2	115.9	118.8	117.1	115.9	116.5
24	116.4	116.3	117.5	120.0	116.7	119.3	116.3	116.1	118.2	116.8	115.9	116.8
25	116.6	116.4	117.8	119.1	116.4	119.0	115.8	115.9	117.8	116.7	116.2	116.5
26	116.5	116.2	118.5	119.2	116.2	118.8	116.2	116.1	117.4	116.5	116.3	116.4
27	116.4	116.1	119.4	118.7	115.5	119.2	116.1	116.2	117.0	116.6	116.0	116.1
28	116.3	116.4	119.8	118.5	116.4	118.9	115.9	116.0	116.9	116.5	116.1	116.0
29	116.1	.....	120.3	118.5	116.6	119.2	116.0	115.6	116.7	116.4	116.2	116.2
30	116.2	.....	121.7	118.4	116.7	119.4	116.1	115.6	116.8	116.7	116.5	116.5
31	116.1	.....	121.6	......	116.5	.....	115.8	115.7	.....	116.5	.....	116.9

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Crocker's Reef Dam.

DAY.	Jan.	Feb.	March.	April.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	116.86	117.21	116.76	116.66	118.21	118.26	117.06	116.76	118.91	120.26	120.46	120.76
2	116.76	117.01	116.56	116.66	118.21	117.86	118.61	116.36	119.01	120.16	120.36	120.71
3	116.61	117.26	116.66	116.71	118.51	117.51	118.26	117.01	119.26	120.16	120.36	120.76
4	116.41	116.56	118.46	117.91	118.66	117.16	117.96	117.01	119.81	120.26	120.31	120.66
5	116.51	116.61	118.11	118.26	118.61	116.76	117.86	116.81	119.81	120.26	120.26	120.16
6	116.86	116.86	117.66	118.41	118.51	116.36	117.71	116.86	119.86	120.56	120.16	120.06
7	116.86	116.86	117.41	118.21	118.21	116.51	117.41	117.01	120.16	120.56	120.16	120.16
8	116.81	116.41	117.26	118.06	117.96	116.66	117.11	116.86	120.66	120.11	120.01	120.36
9	116.81	116.61	117.21	117.86	118.21	116.96	116.81	116.66	120.26	119.86	119.96	120.21
10	116.66	116.66	117.21	117.71	118.16	117.61	116.66	116.51	120.16	120.01	119.86	120.36
11	116.61	116.41	116.86	117.66	118.06	118.06	116.76	116.66	120.26	119.96	120.11	120.11
12	116.41	116.56	116.71	117.56	117.86	118.46	116.76	116.76	120.21	120.01	119.86	120.06
13	116.71	116.76	116.61	117.71	117.61	117.11	116.61	116.11	120.11	119.96	120.06	120.16
14	116.36	116.71	116.41	118.41	118.01	116.76	116.51	116.26	120.11	119.66	120.46	120.21
15	116.41	116.96	116.66	120.01	118.71	116.71	116.41	116.46	120.16	119.71	120.36	120.26
16	116.36	116.51	116.51	121.21	118.31	116.56	116.26	116.06	119.86	119.86	120 26	119.86
17	116.36	116.41	116.26	121.71	117.61	117.21	116.16	116.06	120.11	119.86	120.26	120.46
18	116.26	116.26	115.96	121.76	117.66	117.16	116.36	116.06	120.11	119.71	120.26	120.56
19	116.31	116.31	116.01	121.76	117.51	117.01	115.91	116.11	120.26	119.26	120.36	120.56
20	116.31	116.51	116.31	121.91	117.61	116.81	115.66	116.51	120.16	119.36	120.31	120.51
21	116.21	116.41	116.46	121.91	117.06	116.71	115.26	116.76	120.16	120.01	120.91	120.41
22	116.61	116.56	115.81	121.71	116.96	116.51	115.36	117.06	120.26	120.76	120.96	120.51
23	117.31	116.66	115.91	121.71	116.66	116.46	115.46	116.96	119.86	120.66	121.16	120.11
24	119.11	116.61	116.01	121.11	116.66	116.76	115.91	117.36	120.36	120.31	121.26	120.46
25	119.66	116.76	115.86	120.41	116.91	116.91	116.01	117.36	120.21	120.36	121.06	120.36
26	119.56	116.86	115.81	119.76	117.71	116.76	115.81	117.21	120.16	120.36	120.96	120.46
27	119.11	117.11	116.41	119.11	118.46	116.66	115.56	117.71	120.16	120.31	120.91	120.16
28	118 76	117.21	117.26	118.61	118.91	116.56	115.76	117.26	120.16	120.25	120.86	120.26
29	118.51	.....	117.36	118.56	119.16	116.51	115.96	117.46	120.26	120.31	120.96	120.26
30	118.01	......	117.51	118.31	118.56	116.51	116.66	117.21	120.26	120.36	121.06	120.31
31	117.46	......	117.76	......	118.61	......	117.06	117.76	......	120.41	......	120.46

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Crocker's Reef Dam.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	121.66	120.16	119.76	124.46	122.96	120.41	120.66	120.96	119.41	120.51	121.16	119.86
2	122.16	119.96	119.91	123.96	123.11	120.61	120.66	121.11	119.41	120.66	120.96	120.26
3	122.16	119.91	119.81	123.21	122.91	120.41	120.66	121.11	119.66	120.61	121.06	120.26
4	122.26	120.36	119.61	122.71	122.81	120.21	120.76	120.71	119.71	120.46	121.81	120.26
5	122.46	120.16	119.86	122.31	122.86	120.16	121.21	120.56	120.21	120.41	121.81	120.16
6	122.46	119.96	119.86	122.26	122.91	120.16	121.61	120.51	120.41	120.31	121.76	119.96
7	122.46	120.06	119.86	122.16	122.71	120.41	120.76	120.66	120.31	120.46	122.41	119.66
8	122.36	119.86	119.86	122.01	122.41	120.46	120.86	120.86	120.11	120.66	123.16	120.01
9	122.31	119.91	119.86	121.86	122.16	120.26	120.71	120.76	120.31	121.26	122.96	120.21
10	122.16	119.91	119.81	121.61	121.96	120.46	120.71	120.06	120.16	121.56	122.56	120.26
11	121.81	120.16	119.41	121.36	121.66	120.26	120.41	119.31	120.16	121.46	122.26	121.61
12	121.51	120.11	119.76	121.36	121.51	120.16	120.36	119.51	120.26	121.36	121.96	121.86
13	121.06	120.06	119.66	121.26	121.36	120.11	120.31	119.66	120.16	120.96	121.61	121.56
14	121.01	120.01	120.01	121.21	121.26	120.06	120.86	119.56	120.46	121.11	121.36	121.46
15	120.86	119.91	120.06	121.31	121.11	120.11	120.91	119.66	120.26	120.86	121.16	121.31
16	120.71	120.01	120.01	121.21	120.91	119.46	121.11	120.51	120.31	120.71	120.91	121.16
17	120.51	119.96	120.26	121.41	121.21	120.16	121.11	120.76	120.26	120.56	120.46	121.06
18	120.36	120.06	120.71	121.16	121.36	119.86	121.16	120.71	120.16	120.56	120.51	120.86
19	120.36	119.76	120.56	120.86	120.86	119.86	120.81	120.26	119.86	120.41	120.46	120.66
20	120.26	119.96	120.66	121.76	120.76	119.71	120.46	119.71	119.91	120.26	120.36	120.81
21	120.31	120.01	120.76	120.61	120.71	119.81	120.76	120.16	119.76	120.51	120.26	120.46
22	120.41	119.96	120.56	120.66	120.66	120.16	120.06	119.46	119.81	120.36	120.26	120.31
23	120.26	119.76	120.76	120.61	120.76	119.96	119.71	119.46	119.61	120.31	120.31	120.76
24	120.11	119.86	121.76	121.06	120.51	120.21	119.51	119.51	119.76	120.11	120.21	121.26
25	120.16	119.61	121.66	121.96	120.61	119.86	119.51	119.51	119.76	119.96	120.46	121.66
26	120.16	119.86	121.56	122.26	120.26	119.96	119.56	119.66	119.76	119.86	120.31	121.61
27	119.66	119.76	121.76	123.01	120.36	120.26	119.76	119.51	120.11	119.91	120.26	121.36
28	120.11	119.76	122.46	122.86	120.46	120.56	119.86	119.51	120.16	120.61	120.26	121.41
29	120.26	......	123.36	123.01	120.51	120.46	119.86	119.56	120.01	121.76	120.26	121.31
30	120.11	......	124.01	122.86	120.71	120.46	119.86	119.56	120.01	121.56	120.06	121.51
31	120.26	......	124.76	......	120.61	......	120.06	119.51	......	121.41	......	121.66

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Crocker' Reef Dam.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	121.56	119.96	120.46	123.01	123.46	120.61	119.76	119.61	119.46	119.56	119.66	119.81
2	121.56	119.91	120.41	122.91	123.76	120.56	119.56	119.61	119.36	119.56	119.66	119.86
3	121.46	120.06	120.31	122.46	123.81	120.56	119.56	119.76	119.36	119.56	119.61	119.81
4	121.26	120.06	120.41	122.06	123.36	120.46	119.66	119.66	119.36	119.66	119.56	119.71
5	120.96	120.16	120.36	121.71	123.01	120.26	119.51	119.61	119.36	119.56	119.66	119.71
6	120.71	120.16	120.36	121.66	122.51	120.16	119.81	119.61	119.36	119.61	119.61	119.46
7	120.56	120.16	120.36	121.71	122.36	119.96	119.76	119.66	119.36	119.66	119.61	119.71
8	120.46	120.16	120.36	121.96	122.46	120.06	119.81	119.61	119.46	119.56	119.61	119.76
9	120.46	119.91	120.41	122.81	122.66	119.86	119.81	119.51	119.51	119.56	119.46	119.76
10	120.51	120.11	120.36	122.86	122.51	119.91	119.76	119.51	119.56	119.51	119.46	119.61
11	120.31	120.16	120.36	122.96	122.46	119.86	119.76	119.66	119.56	119.31	119.51	119.76
12	120.21	120.26	120.41	123.06	122.11	119.91	119.36	119.56	119.46	119.36	119.56	119.76
13	120.36	120.21	120.61	122.91	122.06	119.76	119.81	119.61	119.41	119.46	119.56	119.46
14	120.36	120.26	120.91	122.66	122.11	119.61	119.71	119.66	119.46	119.41	119.51	119.76
15	120.31	120.61	121.11	122.46	122.11	119.91	119.71	119.66	119.36	119.56	119.46	119.81
16	120.26	121.66	121.36	122.26	121.96	119.96	119.71	119.56	119.36	119.56	119.86	119.81
17	120.26	121.66	121.36	122.11	121.81	119.86	119.71	119.61	119.36	119.51	119.81	119.66
18	120.31	121.71	121.16	121.96	121.61	119.86	119.76	119.61	119.36	119.46	119.76	119.81
19	120.11	121.71	121.16	121.86	121.26	119.81	119.46	119.61	119.46	119.51	119.66	119.71
20	120.16	121.51	121.06	122.06	121.31	119.76	119.61	119.61	119.46	119.56	119.66	119.76
21	120.26	121.46	121.01	121.86	121.16	119.46	120.01	119.61	119.46	119.51	119.71	119.66
22	120.26	121.26	120.91	121.71	121.16	119.96	119.81	119.56	119.51	119.46	119.46	119.71
23	120.26	121.01	121.21	121.56	121.16	119.86	119.81	119.51	119.46	119.51	119.66	119.71
24	120.31	120.91	121.3	121.66	121.31	119.86	119.76	119.56	119.46	119.56	119.76	119.71
25	120.21	120.86	121.61	122.01	121.06	119.86	119.76	119.61	119.46	119.56	119.76	119.66
26	120.16	120.71	121.61	122.36	120.86	119.76	119.86	119.61	119.46	119.46	119.66	119.66
27	120.21	120.56	121.61	123.06	120.81	119.76	119.91	119.61	119.36	119.56	119.61	119.61
28	120.26	120.56	122.11	123.51	120.66	119.46	119.51	119.61	119.41	119.51	119.96	119.51
29	120.26	120.46	122.96	123.71	120.56	119.71	119.61	119.71	119.46	119.91	119.76	119.61
30	120.11	......	122.89	123.56	120.46	119.81	119.66	119.56	119.46	119.81	120.11	119.61
31	119.96	......	122.90	......	120.46	......	119.61	119.46	......	119.76	......	119.71

HUDSON RIVER AT MOUTH OF MOSES KILL, 2½ MILES ABOVE FORT MILLER, N. Y.

This gage was established December 1, 1906. Readings are taken at 7 A. M. and 5 P. M. each day by Thomas B. Sanders. The gage is located on the left-hand bank of the Hudson river a short distance above the mouth of Moses Kill, 2½ miles above Fort Miller.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River at Moses Kill.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	122.25	120.15	120.70	124.10	124.85	120.75	119.70	119.55	119.50	119.40	119.65	120.10
2	122.25	120.05	120.80	123.75	125.05	120.70	119.55	119.40	119.50	119.55	119.70	119.95
3	122.05	120.30	120.60	123.30	125.20	120.70	119.50	119.55	119.35	119.65	119.65	120.00
4	121.65	120.25	120.80	122.80	124.55	120.55	119.60	119.50	119.30	119.60	119.50	119.90
5	121.20	120.15	120.75	122.35	124.15	120.45	119.50	119.65	119.35	119.55	119.60	119.90
6	121.20	120.05	120.65	122.20	123.55	120.30	119.85	119.60	119.35	119.50	119.60	119.75
7	120.75	120.10	120.65	122.25	123.35	120.20	119.80	119.60	119.30	119.65	119.60	120.00
8	120.80	120.20	120.55	122.70	123.15	120.25	119.80	119.55	119.40	119.70	119.40	119.80
9	120.65	120.25	120.80	123.75	123.65	120.05	119.85	119.35	119.50	119.55	119.50	119.80
10	120.85	120.45	120.75	124.00	123.50	120.15	119.75	119.60	119.45	119.45	119.60	119.60
11	120.70	120.10	120.65	124.10	123.40	120.05	119.80	119.60	119.50	119.30	119.50	119.80
12	120.40	120.30	120.75	124.20	122.90	120.05	119.60	119.60	119.55	119.45	119.45	119.80
13	120.75	120.25	120.85	124.05	122.75	119.85	119.70	119.60	119.40	119.40	119.50	119.50
14	120.80	120.25	121.25	123.65	122.95	119.55	119.75	119.55	119.35	119.45	119.50	119.80
15	120.65	120.65	121.50	123.25	123.00	120.15	119.65	119.55	119.40	119.50	119.50	119.90
16	120.50	122.90	121.90	123.00	122.70	120.05	119.70	119.45	119.45	119.50	120.00	120.00
17	120.50	122.80	121.85	122.85	122.10	120.10	119.70	119.50	119.40	119.50	120.00	119.85
18	120.35	122.65	121.65	122.70	122.20	120.00	119.70	119.60	119.40	119.40	119.80	119.90
19	120.40	122.55	121.55	122.65	121.80	119.90	119.35	119.55	119.40	119.45	119.75	119.70
20	120.40	122.40	121.45	122.65	121.80	119.85	119.60	119.60	119.40	119.50	119.75	119.55
21	120.35	122.25	121.35	122.55	121.60	119.65	120.00	119.55	119.40	119.50	119.70	119.55
22	120.35	122.00	121.30	122.35	121.60	120.00	120.00	119.60	119.45	119.50	119.40	119.70
23	120.25	121.65	121.50	122.20	121.50	120.05	119.95	119.50	119.50	119.50	119.45	119.70
24	120.35	121.60	121.80	122.20	121.85	119.90	119.90	119.60	119.45	119.50	119.70	119.70
25	120.45	121.35	122.05	122.75	121.35	119.90	119.75	119.60	119.50	119.50	119.70	119.50
26	120.05	121.15	121.85	123.25	121.05	119.80	119.60	119.60	119.45	119.50	119.60	119.70
27	120.45	121.10	122.25	124.10	121.15	119.75	119.60	119.55	119.35	119.55	119.75	119.65
28	120.40	121.00	122.85	124.75	121.10	119.50	119.50	119.60	119.50	119.50	120.05	119.55
29	120.40	120.85	123.80	125.15	120.85	119.70	119.60	119.55	119.40	119.80	120.00	119.60
30	120.25	......	124.45	124.85	120.70	119.80	119.70	119.50	119.40	119.65	120.10	119.70
31	120.15	......	124.45	......	120.70	......	119.65	119.50	......	119.80	......	119.70

HUDSON RIVER OPPOSITE MOUTH OF SNOOK KILL, 2½ MILES BELOW FORT EDWARD, N. Y.

This gage was established April 11, 1904, by J. A. O'Connor, for this Department. The gage is attached to a tree along the left-hand bank of the Hudson river between the river and the Champlain canal. It is divided from zero to 16 feet by painted tenth-foot marks and readings are taken at 9 A. M. and 5 P. M. by R. S. Metcalf. The zero of the gage is at elevation 114.59.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River opposite Snook Kill near Fort Edward, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	122.99	120.39	121.04	125.25	126.25	121.05	119.90	119.80	119.70	119.80	119.85	120.10
2	122.79	120.29	121.24	124.65	126.45	121.05	119.80	119.80	119.60	119.90	120.05	120.15
3	122.59	120.59	121.00	124.20	126.65	121.00	119.75	120.00	119.60	119.90	119.90	120.10
4	122.14	120.34	121.00	123.75	125.80	120.85	119.85	119.90	119.60	119.80	119.70	120.00
5	121.89	120.49	120.90	123.15	125.30	120.60	119.85	119.90	119.60	119.80	119.95	120.10
6	121.59	120.44	120.85	122.95	124.45	120.60	120.20	119.85	119.60	119.85	119.85	119.70
7	121.34	120.64	120.80	122.85	124.10	120.35	120.00	119.90	119.60	119.95	119.85	120.00
8	121.24	120.59	120.85	123.25	124.15	120.45	120.10	119.80	119.65	119.90	119.75	120.05
9	121.29	120.29	120.95	124.65	124.60	120.15	120.05	119.75	119.75	119.80	119.75	120.00
10	121.29	120.79	120.90	124.95	124.35	120.25	120.00	119.75	119.80	119.70	119.70	119.90
11	121.09	120.49	120.90	125.10	124.15	120.25	120.10	119.90	119.80	119.55	119.75	120.05
12	120.84	120.59	120.95	125.35	123.65	120.30	119.70	119.80	119.70	119.60	119.90	120.05
13	121.09	120.64	121.10	125.10	123.50	120.10	120.15	119.85	119.65	119.65	119.80	119.80
14	121.14	120.54	121.75	124.65	123.70	119.75	119.95	119.90	119.65	119.70	119.80	120.10
15	120.99	121.24	121.85	124.15	123.70	120.50	119.90	119.85	119.60	119.85	119.70	120.10
16	120.94	123.14	122.35	123.80	123.50	120.25	119.90	119.75	119.60	119.80	120.30	120.15
17	120.89	123.61	122.35	123.65	123.10	120.25	119.90	119.80	119.60	119.70	120.10	119.95
18	120.84	123.54	122.15	123.40	122.80	120.20	120.00	119.90	119.65	119.65	120.10	120.20
19	120.59	123.54	122.00	123.40	122.25	120.10	119.60	119.85	119.60	119.65	120.00	120.00
20	120.89	123.39	121.90	123.50	122.30	120.10	120.05	119.80	119.60	119.75	119.95	119.90
21	120.69	123.09	121.75	123.25	122.15	119.70	120.35	119.85	119.65	119.75	120.00	119.80
22	120.74	122.79	121.65	123.00	122.05	120.25	120.05	119.85	119.70	119.80	119.70	119.95
23	120.79	122.34	121.75	122.85	122.00	120.20	120.20	119.75	119.75	119.75	119.95	119.95
24	120.74	122.14	122.05	122.90	122.30	120.05	119.95	119.85	119.75	119.80	120.00	119.95
25	120.59	121.89	122.35	123.55	121.85	120.10	120.00	119.85	119.70	119.75	120.00	119.75
26	120.34	121.74	122.30	124.10	121.60	120.10	119.80	119.85	119.70	119.70	119.95	119.95
27	120.89	121.59	122.70	125.35	121.30	120.00	120.00	119.90	119.60	119.85	119.95	119.85
28	120.61	121.44	123.30	126.15	121.25	119.80	119.70	119.85	119.65	119.75	120.30	119.75
29	120.61	121.34	124.75	126.50	121.10	120.00	119.85	119.95	119.70	120.20	120.05	119.85
30	120.54	. . .	125.30	126.10	121.00	120.05	119.90	119.75	119.60	120.10	120.45	119.90
31	120.49	. . . .	125.60	. . . .	121.00	. . . .	119.90	119.75	. . . . . .	120.45	. . . . . .	120.00

HUDSON RIVER AT BRIDGE STREET, FORT EDWARD, N. Y.

This gage was established April 11, 1904, by J. A. O'Connor, for this Department. The gage is located on the down-stream end of the pier nearest the left-hand bank of the Hudson river at Bridge street bridge. This bridge is about 2,500 feet down-stream from the dam of the International Paper Company and the river is divided by an island and the gage is located on the left-hand channel. Readings are taken at 8 A. M. and 5 P. M. by B. F. Thebo.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River at Bridge Street, Fort Edward, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	123.1	121.1	121.6	126.0	127.5	121.1	120.10	119.60	119.60	119.80	119.80	120.20
2	122.9	120.8	121.3	125.55	127.65	121.1	120.10	120.10	119.60	119.80	119.80	120.20
3	122.75	120.7	121.3	125.0	127.8	120.9	119.90	120.90	119.60	119.80	119.80	120.00
4	122.1	120.5	121.3	124.1	126.8	120.75	119.70	120.60	119.60	119.80	119.80	120.00
5	122.1	120.5	121.3	123.75	126.3	120.6	119.70	120.60	119.60	119.80	119.80	120.00
6	122.1	120.3	121.1	123.3	125.1	120.6	120.10	120.60	119.40	119.80	119.80	120.00
7	121.7	120.3	120.9	123.3	125.1	120.1	120.05	120.60	119.50	119.80	119.80	120.00
8	121.3	120.3	121.2	123.9	124.75	120.1	120.20	120.60	119.60	119.80	119.80	120.00
9	121.3	120.85	121.6	125.55	125.1	120.1	120.20	120.90	119.60	119.80	119.80	120.00
10	121.3	121.1	121.3	125.9	125.1	120.1	120.20	120.80	119.60	119.60	119.80	120.00
11	121.3	120.6	121.3	126.2	124.55	120.1	120.25	120.80	119.60	119.60	119.80	120.00
12	121.1	120.6	121.1	126.35	124.2	120.1	119.30	120.80	119.60	119.60	119.80	120.00
13	121.1	120.6	121.1	126.0	124.0	120.1	119.80	120.80	119.35	119.40	119.80	120.00
14	121.1	120.75	121.4	125.35	124.3	120.2	119.80	120.80	119.60	119.40	119.80	120.00
15	*a*	121.25	122.2	124.75	124.3	120.1	119.80	120.80	119.60	119.40	120.00	120.00
16	120.75	123.85	122.9	124.6	124.2	120.1	119.80	120.60	119.60	119.40	120.20	120.10
17	120.6	124.6	123.1	124.2	124.1	120.1	119.80	120.80	119.60	119.40	120.20	120.00
18	120.6	124.5	122.75	123.9	123.1	120.1	119.80	120.60	119.60	119.40	120.00	120.00
19	120.6	124.3	122.6	123.65	122.3	120.1	119.30	120.60	119.60	119.40	119.80	120.00
20	120.3	124.1	122.6	124.1	122.3	120.1	119.80	120.60	119.40	119.40	119.80	119.80
21	120.1	124.1	122.6	123.6	122.1	119.55	120.20	120.60	119.40	119.40	119.80	119.80
22	120.6	123.35	122.1	123.6	121.75	120.1	120.20	120.60	119.60	119.40	119.80	119.80
23	120.6	122.9	122.45	123.3	121.3	120.1	120.20	120.60	119.60	119.40	119.80	119.80
24	120.1	122.6	123.1	123.1	121.3	120.1	120.20	120.60	119.60	119.40	119.80	119.80
25	120.1	122.4	123.1	123.4	121.5	120.1	120.20	120.60	119.60	119.40	119.80	119.80
26	120.1	122.2	123.1	124.8	121.5	119.9	119.80	120.60	119.60	119.60	119.80	119.80
27	120.6	122.0	123.1	126.25	121.1	119.6	119.60	120.60	119.60	119.60	120.00	119.30
28	120.6	121.6	124.3	127.1	121.1	119.9	119.60	120.60	119.60	119.40	120.00	119.30
29	120.8	121.0	125.9	127.7	121.5	119.9	119.60	120.60	119.60	119.40	120.00	119.30
30	120.6	......	126.6	127.3	121.5	119.9	119.60	120.40	119.60	119.80	120.20	119.30
31	121.1	......	126.7	......	121.5	......	119.40	119.60	......	119.80	......	119.30

a No record.

HUDSON RIVER AT FORT EDWARD DAM.

This station, which is located at the dam of the International Paper Company, was established by Geo. W. Rafter in 1895, in connection with Upper Hudson storage surveys.* Since 1899 this station has been maintained by the U. S. Geological Survey in coöperation with this Department. The dam is of framed timber on slate rock foundation, and has but little leakage. The crest is straight, very nearly level, and 587.6 feet in length. Flash-boards are usually maintained on the dam from 15 inches to 18 inches in height. A record is kept of the height of flash-boards, and of the times of their setting and removal.

There are 62 water-wheels in the adjoining mill. These are nearly all of modern types which have been tested at the Holyoke flume. A record is kept of the daily run of each in hours, as well as of the working head, which is usually 18 feet. The discharge through the turbines is taken from diagrams expressing the flow as a function of the working head and number of wheel-hours run.

* See report of State Engineer and Surveyor of New York, 1895, p. 105.

In the winter of 1896–1897, a flood spillway was cut around the south end of the dam, over which the water begins to flow whenever it reaches the level of the crest of the flash-boards. The profile of the spillway is very irregular and causes some uncertainty in the calculated flow during times of high water.

Whenever the flash-boards are off from the main dam, the flow is computed by means of coëfficients derived from the United States Geological Station experiments on a model dam of similar cross-section.

With the flash-boards on, the flow has been computed from Francis' well-known formula for the thin-edged weir. During the dry season, but little water passes over the dam, the entire flow being employed to drive the turbines.

A new profile of the crest of the dam, obtained in 1906, has been used to determine the discharge for the present year.

The drainage area tributary to the Hudson above Fort Edward is 0.62 of that of the same stream above Mechanicville gaging station. The principal intervening tributaries are the Hoosic river and Batten kill, having drainage areas of 730 and 460 square miles, respectively.*

During the navigation season, water is diverted from Hudson river at Glens Falls feeder dam, seven miles above Fort Edward, for the supply of the Champlain canal.

Current-meter measurements have been made in the Glens Falls feeder as follows:

Owing to a mistake of one foot in the reduction of levels by the U. S. Geological Survey, the records heretofore published for this station for 1906 and 1907 are vitiated. Revised tables for these years are published herewith in conjunction with the data for 1908.

* Water power of the Upper Hudson river is described in report of New York State Engineer and Surveyor, 1895, pages 124–154.

Mean Daily Discharge, Second-feet, of Hudson River at International Paper Co.'s Dam, Ft. Edward, N. Y.

DAY.	Jan.	Feb
1906.		
1	5	7,21
2	4	3,9
3	4	3,2
4	4	*2,6
5	4	4,8
6	2	4,0
7	*4	3,8
8	4	3,9
9	3	3,9
10	3	1,6
11	3	*2,4
12	3	4,0
13	1	3,7
14	*2	4,0
15	4	4,0
16	4	3,6
17	4	1,2
18	4	*3,1
19	3	3,7
20	1	4,0
21	*2	3,5
22	4	4,2
23	5,...	4,4
24	9,528	2,7
25	12,997	*3,1
26	12,294	5,2
27	9,698	5,0
28	*8,958	4,9
29	8,133	.
30	8,304	.
31	6,561	
Mean	5,320	3,8

* Sundays.

Mean Daily Discharge, Second-feet, of Hudson River at International Paper Co.'s Dam, Ft. Edward, N. Y.

* Indicates Sundays. *b* Record not available.

Mean Daily Discharge, Second-feet, of Hudson River at International Paper Co.'s Dam, F Edward, N. Y.

DAY.		Nov.	Dec.
1908.			
1	82	*684	2,574
2	81	2,768	2,564
3	51	1,430	2,398
4	97	1,700	2,088
5	51	1,964	2,148
6	91	1,530	*1,173
7	34	1,682	2,259
8	80	*684	1,901
9	18	1,453	1,704
10	19	1,348	1,516
11	34	1,541	2,382
12	22	1,348	2,061
13	18	1,348	*1,669
14	18	1,345	2,361
15	31	*684	2,634
16	82	3,206	2,165
17	7	1,927	1,936
18	34	2,237	2,538
19	19	1,633	1,881
20	18	1,548	*1,044
21	18	1,786	1,801
22	18	*1,044	1,954
23	18	2,423	1,901
24	18	1,995	2,121
25	34	2,027	684
26	18	1,818	1,756
27	18	2,851	*1,348
28	73	3,065	1,348
29	17	*2,525	1,797
30	17	3,775	2,088
31	14	...	1,818
Mean	2.	1,847	1,922

* Indicates Sundays.

Monthly Discharge of Hudson River at International Paper Co.'s Dam, Fort Edward, N. Y.
[Drainage area, 2,800 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1906.					
January	12,997	1,599	5,320	1.90	2.18
February	7,210	1,329	3,824	1.37	1.42
March	9,676	1,444	4,781	1.71	1.97
April	21,507	5,747	11,715	4.18	4.68
May	12,065	4,941	8,836	3.15	3.62
June	9,752	1,674	5,334	1.90	2.13
July	8,925	324	3,539	1.26	1.45
August	3,505	324	2,156	0.770	0.886
September	3,442	865	2,052	0.733	0.821
October	4,583	684	2,351	0.840	0.966
November	5,464	1,230	3,162	1.13	1.27
December	3,944	684	2,682	0.958	1.10
1907.					
January	10,271	664	5,439	1.94	2.23
February	3,610	911	2,605	0.930	0.967
March	5,677	1,212	3,269	1.17	1.35
April	33,973	4,952	13,457	4.81	5.39
May	21,579	3,900	11,179	3.99	4.59
June	5,273	1,761	3,458	1.24	1.39
July	7,202	332	2,350	0.839	0.965
August	3,153	664	1,730	0.618	0.711
September	5,477	664	2,750	0.982	1.10
October	6,601	1,436	4,437	1.58	1.82
November	24,928	1,596	10,276	3.69	4.11
December	11,378	1,567	6,162	2.20	2.53
1908.					
January	9,997	1,781	4,678	1.67	1.92
February	10,054	1,621	4,114	1.47	1.59
March	17,364	1,441	4,251	1.52	1.75
April	27,034	4,428	15,220	5.44	6.09
May	26,346	2,879	12,779	4.56	5.24
June	6,011	684	2,936	1.05	1.18
July	3,045	684	1,872	0.668	0.768
August	1,932	684	783	0.280	0.322
September	1,111	684	953	0.340	0.381
October	2,687	684	1,552	0.554	0.637
November	3,775	684	1,847	0.660	0.739
December	2,634	684	1,922	0.687	0.790

HUDSON RIVER ABOVE FEEDER DAM NEAR GLENS FALLS, N. Y.

Water is diverted from the Hudson river to supply Champlain canal at a State dam located about two miles up-stream from Glens Falls. The gage was established in the pond above this dam by John R. Kaley, March 9, 1905. The gage is located about 400 feet up-stream from the left-hand end of the dam and consists of a vertical scale with painted tenth-foot marks reading from zero to 12 feet, attached to a pile about 30 feet from the river bank. The gage zero is at elevation 277.966. The dam, which has a crest length of 616 feet, is at a general elevation of about 280.9. Water-power was formerly extensively used by sawmills at this dam, now mostly abandoned. The gage is maintained by

this Department in coöperation with the U. S. Weather Bureau. Gage readings are taken each morning and night by Albert B. Fisher.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Hudson River above Feeder Dam near Glens Falls, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	283.97	281.57	282.62	285.42	286.07	*	281.22	281.82	281.22	282.12	282.07	281.67
2	283.87	280.97	282.57	285.17	286.22	*	281.27	282.02	281.37	282.32	282.12	281.87
3	283.72	281.22	282.57	284.47	286.32	*	281.27	281.92	281.72	282.22	281 87	281.72
4	283.67	281.37	282.77	284.37	285.67	*	281.37	281.67	281.87	282.12	281.87	281.62
5	283.27	281.37	282.87	284.02	285.57	*	281.42	281.72	281.82	282.17	281.82	281.57
6	283.07	281.62	282.52	283.82	284 92	*	281.52	281.77	281.97	282.17	281.77	281.32
7	282.72	281.82	282.62	283.92	284.57	*	281.42	281.47	282.07	282.12	281.77	281.52
8	282.67	281.47	282.57	284.27	284.97	*	281.52	281.37	281.97	281.97	281.92	281.52
9	282.57	281.22	282.72	285.17	284.87	*	281.47	281.52	281.82	281.67	281.87	281.47
10	282.57	281.72	282.62	285.42	285.02	*	281.47	281.52	281.87	281.67	281.87	281.42
11	282.57	281.42	282.67	285.47	284.47	281.77	281.52	281.57	281.67	282.12	281.87	281.77
12	282.57	282.07	282.72	285.62	284.27	281.57	281.32	281.77	281.82	281.47	281.77	281.67
13	282.52	281.92	282.82	285.47	284.47	281.47	281.42	281.67	281.57	281.67	281.82	281.57
14	282.37	281.92	282.82	284.92	284.42	281.57	281.32	281.67	281.32	282.07	281.77	281.72
15	282.27	282.17	283.22	284.72	284.32	281.57	281.32	281.42	281.27	282.07	282.12	281.77
16	282.17	283.57	283.42	284.52	284.82	281.47	281.47	281.62	281.67	281.77	282.62	281.62
17	282.22	284.42	283.57	284.37	284.02	281.47	281.82	281.67	281.97	281.72	282.37	281.67
18	282.22	284.67	283.42	284.27	283.72	281.37	281.82	281.52	281.82	281.92	282.22	281.82
19	282.22	284.67	283.42	284.27	283.52	281.47	281.87	281.42	281.82	281.87	281.96	281.52
20	282.22	284.02	283.42	284.22	283.57	281.37	282.02	281.57	281.87	281.97	281.97	281.47
21	282.22	283.87	283.27	284.22	283.37	281.17	282.42	281.62	281.67	281.82	282.07	281.52
22	282.12	283.72	283.22	283.92	283.32	281.57	282.12	281.52	281.72	281.92	281.97	281.47
23	282.22	283.42	283.22	283 82	283.37	281.37	282.07	281.57	281.62	281.87	281.72	281.47
24	282.17	283.12	283.32	284.02	283.47	281.17	281.92	281.77	281.42	281.82	281.37	281.52
25	282.32	283.02	283.72	284.42	283.12	281.17	281.72	281.97	281.27	282.07	281.32	281.27
26	282.32	282.97	283 72	284.77	282.87	280.97	281.52	281.92	281.07	281.87	281.17	281 37
27	282.12	283.02	284.02	285.62	282.67	280.97	281.52	282.07	281.27	281.82	281.77	281.27
28	282.37	282.97	284.37	286.17	282.72	281.27	281.67	282.07	281.82	282.27	281.82	281.42
29	282.37	282.87	285.42	286.37	282.57	281.17	281.87	281.82	281.77	282.37	281.72	281.57
30	281 97	......	285.62	286.22	282.57	281.07	281.82	281.42	282.12	282.27	281.97	281 62
31	281.62	......	285.57	......	282.57	......	281.77	280.90	......	282.37	......	281.47

* No record.

Current-meter Discharge Measurements of Glens Falls Feeder above Glens Falls, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.a
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Aug. 25...	A. T. Clark	3.80	294	0.901	265
Aug. 25...	A. T. Clark	3.85	296	0.990	293
Aug. 25...	A. T. Clark	4.05	303	0.950	288
Aug. 25...	A. T. Clark	3.97	313	0.965	302
Aug. 25...	A. T. Clark	3.97	313	1.04	325
Sept. 18...	A. R. Patchke	3.50	285	0.954	272
Sept. 18...	A. R. Patchke	3.50	289	0.969	280
Sept. 18...	A. R. Patchke	3.44	289	1.00	289
Sept. 18...	A. R. Patchke	3.46	290	0.990	287

a At farm bridge about one-quarter mile down-stream from feeder dam.

Current-meter Discharge Measurements of Glens Falls Feeder at Ferry St. Bridge, Sandy Hill, N. Y.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
1908.		*Feet.*	*Square feet.*	*Ft. per second.*	*Second-feet.*
Aug. 25	E. F. Weeks	7.15	189	0.746	141
Aug. 25	E. F. Weeks	7.22	185	0.838	155
Aug. 25	E. F. Weeks	7.25	185	0.822	152
Aug. 25	E. F. Weeks	7.25	185	0.849	157
Aug. 25	E. F. Weeks	7.25	185	0.909	168
Sept. 18	E. F. Weeks	6.72	213	0.685	146
Sept. 18	E. F. Weeks	6.90	203	0.719	146
Sept. 18	E. F. Weeks	6.90	203	0.694	141
Sept. 18	E. F. Weeks	6.90	203	0.685	139
Sept. 18	E. F. Weeks	6.90	203	0.754	153

HUDSON RIVER AT CORINTH, N. Y.

A gaging station was established by this Department on Hudson river at Corinth October 1, 1906. Readings are taken each morning and night by E. H. Bowker. The record is maintained in coöperation with the U. S. Weather Bureau. Measurements of the flow at this point have been made by the U. S. Geological Survey. These measurements are connected to a gage which is read by the International Paper Company.

Mean Daily Gage Height, in Feet, of Hudson River at Corinth, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Nov.	Dec.
1908.									
1	3.15	0.60	1.50	5.25	6.60	1.95	0.10	0.55	0.70
2	3.00	0.70	1.25	4.90	6.65	1.55	0.10	0.85	0.60
3	2.85	0.70	1.15	4.35	6.45	1.50	0.60	0.20	0.25
4	2.55	0.60	1.05	3.75	5.80	1.30	0.60	0.25	0.15
5	2.35	0.55	1.10	3.30	5.35	1.05	0.50	0.20	0.10
6	2.00	0.50	1.00	3.15	4.75	1.00	0.40	0.20	0.10
7	1.80	0.60	1.20	3.25	4.50	0.70	0.60	0.20	0.20
8	1.75	0.70	1.20	4.15	4.75	0.50	0.40	0.10	0.35
9	1.65	0.70	1.10	4.95	4.65	0.50	0.30	0.05	0.55
10	1.45	0.60	1.00	4.75	4.95	0.50	0.30	0.05	0.60
11	1.40	0.50	1.00	5.40	4.40	0.25	0.30	0.10	0.35
12	1.20	0.60	1.20	5.60	4.00	0.00	0.30	0.15	0.30
13	1.05	0.60	1.50	5.45	4.00	0.05	0.30	0.30	0.30
14	1.05	0.70	1.65	4.80	4.20	0.00	0.30	0.25	0.40
15	1.20	0.95	2.10	4.35	4.10	0.35	0.30	0.20	0.50
16	1.10	3.00	2.35	4.20	3.95	0.55	0.30	0.35	0.50
17	1.10	3.55	2.50	3.95	3.85	0.50	0.20	0.50	0.50
18	1.00	3.55	2.50	3.80	3.35	0.50	0.30	0.50	0.50
19	0.90	3.50	2.35	3.80	3.00	0.50	0.40	0.40	0.50
20	0.90	2.95	2.25	3.80	2.80	0.40	0.40	0.40	0.50
21	0.90	2.80	2.20	3.70	2.60	0.40	0.40	0.75	0.40
22	0.90	2.65	2.20	3.30	2.85	0.40	0.40	0.15	0.30
23	1.00	2.45	2.10	3.35	2.90	0.30	0.40	0.30	0.20
24	0.85	2.20	2.55	3.40	2.75	0.40	0.30	0.35	0.10
25	0.65	1.95	2.80	4.35	2.55	0.40	0.30	0.45	0.05
26	0.60	1.90	2.90	4.75	2.40	0.30	0.30	0.50	0.10
27	0.60	1.50	3.45	6.15	2.30	0.20	0.30	0.60	0.10
28	0.70	1.50	3.95	6.45	1.95	0.25	0.30	0.75	0.10
29	0.70	1.50	5.45	6.80	1.70	0.50	0.30	0.80	0.10
30	0.70	....	5.60	6.35	1.85	0.00	0.40	0.90	0.30
31	0.70	....	5.65	....	2.05	....	0.40	......	0.20

SACANDAGA RIVER.

DESCRIPTION.

Sacandaga river is one of the larger tributaries of the upper Hudson. It drains extensive portions of the southeast slope of the Adirondack region as well as a portion of the plateau lying north of Mohawk river and south of the Adirondack mountains. The head waters of the stream arise in the slopes surrounding Lake Pleasant, Sacandaga and Piseco lakes. Above Northville the drainage basin is rugged and almost completely forest-covered. From Northville to Conklinville the stream winds through a sandy valley flanked by steep slopes. The width of this valley averages about one mile from Northampton to Conklinville. Above Northampton is an extensive flat lying at elevation about 740 feet. This flat is drained by Mayville, Vly and Hann's creeks, and contains extensive swamp areas. From Northville to Conklinville, a distance along the general course of the stream of about 22 miles, there is very little fall. The elevation at Conklinville is about 720 feet. Sacandaga river enters Hudson river at Luzerne at elevation about 540 feet. The distance from Conklinville to Luzerne is about seven miles along the general course of the stream.

SACANDAGA RIVER AT NORTHVILLE, N. Y.

Observations are taken once each day, beginning December 1, 1904. The observer is A. S. Pickard. A staff gage, 16 feet in length, is attached to the down-stream wing of west abutment of highway bridge near railroad station. The elevation of zero mark is 742.51. The water sometimes falls below the zero of this gage, and in such cases gage readings are taken from a scale attached to the down-stream side of center pier. This section reads from one foot above to four feet below the zero of the main gage. The station is maintained by this Department in coöperation with the U. S. Weather Bureau.

Mean Daily Elevation of Water-surface (Barge Canal Datum) of Sacandaga River at Northville, N. Y.

1
1
1
1
1
1
1
1
1
1
2
2
2
2
2
2
2
2
2
2
3
3

a Ice obstruction: no record

INDIAN RIVER AT INDIAN LAKE, N. Y.

A record of the stage of water in Indian lake reservoir, located in the upper Hudson river basin, as described in preceding reports, has been continued. The stage of water in the reservoir is shown in the following table:

Mean Daily Gage Height in feet, of Indian Lake at Indian Lake, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	35.65	34.9	34.75	28.25	36.85	34.4	33.45	27.15	20.3	14.0	8.9	6.55
2	35.6	34.9	34.6	28.5	36.65	34.35	33.4	26.9	20.0	13.85	8.88	6.4
3	35.5	34.88	34.35	28.65	36.25	34.35	33.15	26.65	19.85	13.62	8.75	6.38
4	35.35	34.7	34.1	28.85	35.85	34.3	32.9	26.4	19.62	13.4	8.62	6.25
5	35.15	34.4	33.85	28.9	35.5	34.25	32.65	26.2	19.4	13.3	8.5	6.15
6	35.08	34.2	33.3	29.08	35.15	34.2	32.4	25.9	19.2	13.1	8.38	6.0
7	35.08	34.0	32.85	29.35	35.25	34.15	32.15	25.8	18.0	12.9	8.25	5.9
8	35.08	33.85	32.4	30.0	35.62	34.1	31.9	25.5	18.8	12.75	8.1	5.85
9	35.08	33.65	31.95	30.6	35.85	34.08	31.75	25.25	18.6	12.6	8.0	5.75
10	35.08	33.3	31.5	31.25	35.9	34.05	31.6	25.0	18.35	12.4	7.88	5.65
11	35.08	33.05	31.08	31.9	35.9	34.0	31.3	24.75	18.0	12.25	7.8	5.6
12	35.08	32.85	30.62	32.4	35.4	33.95	31.0	24.55	17.75	12.08	7.7	5.6
13	35.05	32.6	30.15	32.9	34.9	33.9	30.65	24.38	17.5	11.9	7.62	5.6
14	35.05	32.4	29.75	33.35	34.4	33.88	30.4	24.15	17.25	11.75	7.55	5.5
15	35.0	32.62	29.4	33.6	34.08	33.85	30.1	23.9	17.05	11.6	7.45	5.45
16	35.0	33.5	29.08	33.88	33.85	33.8	29.85	23.65	16.85	11.4	7.38	5.35
17	34.95	34.15	28.75	34.1	33.9	33.75	29.65	23.5	16.62	11.25	7.3	5.3
18	34.95	34.65	28.4	34.35	34.0	33.7	29.5	23.35	16.4	11.08	7.2	5.2
19	34.9	34.85	28.08	34.65	34.08	33.65	29.3	23.08	16.15	10.9	7.08	5.1
20	34.9	35.0	27.7	34.9	34.1	33.65	29.08	22.85	15.95	10.75	6.95	5.0
21	34.9	35.08	27.25	35.0	34.15	33.65	29.0	22.62	15.8	10.6	6.85	4.9
22	34.88	35.08	26.9	35.08	34.05	33.65	29.0	22.4	15.62	10.4	6.75	4.85
23	34.88	35.08	26.6	35.25	33.9	33.65	29.0	22.15	15.4	10.25	6.65	4.75
24	34.88	35.05	26.2	35.75	33.85	33.65	28.95	21.88	15.2	10.08	6.62	4.62
25	34.88	35.05	25.85	36.2	33.9	33.65	28.95	21.65	15.0	9.9	6.6	4.6
26	34.85	34.95	25.65	36.65	34.0	33.65	28.75	21.45	14.85	9.75	6.56	4.5
27	34.85	34.95	25.65	37.0	34.05	33.62	28.45	21.25	14.65	9.6	6.6	4.4
28	34.88	34.88	26.0	37.0	34.08	33.6	28.25	21.05	14.45	9.4	6.62	4.35
29	34.88	34.85	26.75	36.9	34.05	33.55	28.05	20.85	14.25	9.3	6.62	4.25
30	34.9	......	27.45	36.65	34.15	33.5	27.65	20.7	14.25	9.15	6.62	4.15
31	34.9	......	27.88	......	34.35	......	27.4	20.5	......	9.05	......	4.08

Record of Opening of Gates and Logways, Indian Lake Dam.

DATE.	Sluice-gate A open.	Sluice-gate B open.
1908.	*Feet.*	*Feet.*
January 1 to 6	....	1.5
February 3 to 14	....	5.0
February 8 to 14	6.0	....
March 1 to 27	....	5.0
March 5 to 25	5.0	....
April 25	....	1.5
April 26	....	2.5
April 27 to 30*a*	....	4.5
May 1 to 5*b*	....	4.5
May 6	....	1.25
May 21 to 23	....	3.58
July 2 to 7, 10 to 20 and 25 to 30, inclusive	....	5.0
July 8 to 9	....	3.0
Aug 1 to Dec. 31, inclusive	....	5.0

a Small logway open 10.0 ft. on 27th and 14.0 on 28th.
b Main logway open 1.33 ft. in width May 2 to 11, inclusive. Main logway open 15.0 ft. in width May 12 to 16, inclusive. Small logway open 15.0 ft. May 1 to 5, inclusive.

DELAWARE RIVER DRAINAGE BASIN.

DESCRIPTION OF DELAWARE RIVER.

The head waters of Delaware river rise in Delaware, Greene and Schoharie counties, N. Y., the source of the main stream, which is commonly known as West branch, to distinguish it from the smaller East or Pepacton branch, being a small lake almost on the line of Schoharie and Delaware counties, at an elevation of 1,886 feet above tide. From this lake it flows southwestward across central Delaware county to Deposit, where it receives Oquaga creek, a large tributary draining eastern Broome county, and turns abruptly to the southeast, forming the boundary line between New York and Pennsylvania until Port Jervis is reached. Here it turns again to the southwest and flows for a distance of about 40 miles along the base of the Shawangunk range until it passes through the water gap, from which point it flows irregularly southward to Trenton. Below Trenton the course is in general southwestward to Delaware Bay. South of Port Jervis it forms the dividing line between Pennsylvania and New Jersey, and for a few miles it is the boundary between Delaware and New Jersey.

East branch rises at Grand Gorge in northeastern Delaware county, and flows parallel to West branch across southern Delaware county, uniting with the latter stream at Hancock.

The total length of the river from the mouth to the head of West branch is about 410 miles; its drainage area, measured at Philadelphia and including Schuylkill river, is 10,100 square miles, of which about 2,580 square miles lie in New York, 5,750 in Pennsylvania, and 1,800 in New Jersey. The river is tidal to Trenton, which lies also at the head of navigation.

EAST BRANCH, DELAWARE RIVER, AT HANCOCK, N. Y.

This station was established October 14, 1902, by Robert E. Horton, and has since been maintained by the U. S. Geological Survey in coöperation with this Department. It is located at the highway bridge one-half mile southeast of the Erie railroad station at Hancock, N. Y., and one mile above the junction with West branch of the Delaware. The Erie railroad bridge is just below the station.

The channel is straight for 600 feet above and 300 feet below the station. The current is swift. Both banks are of medium height and are not liable to overflow. The bed of the stream is composed of rocks and gravel. There are three channels at low water and five channels at high water. During low water the elevation of the water-surface at the station is lower than the water-surface on West branch of the Delaware, but the gage heights are probably not affected by backwater from West branch, as there is considerable fall between the gaging station and the junction of the branches.

Discharge measurements are made from the down-stream side of the five-span iron highway bridge to which the gage is attached. The bridge has a total span of 425.5 feet between abutments. The initial point for soundings is the face of the right abutment at the top.

A standard chain gage is attached to the lower chord of the second span from the left end of the bridge on the up-stream side. It was installed July 21, 1903, to replace the old wire gage. The gage datum was not changed. The length of the chain from the end of the weight to the marker is 32.43 feet. The gage is read twice each day by D. B. Van Etten. The bench-mark is a circular chisel draft on the top of the left abutment on the down-stream side. It is marked "B. M." Its elevation is assumed to be 100.00. The elevation of the top of the gage pulley is 104.47. The elevation of water-surface, when the gage reads zero, is 72.07.

Mean Daily Gage Height, in Feet, of East Branch, Delaware River, at Hancock, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	4.8	4.4	3.5	5.6	6.3	3.9	2.7	2.8	2.4	3.0	3.7	3.0
2	4.6	3.8	4.0	5.6	5.8	3.7	2.6	2.6	2.3	2.8	3.6	3.0
3	4.4	3.7	4.4	5.2	5.7	3.5	3.2	2.7	2.4	3.0	3.4	2.9
4	4.2	3.9	4.0	4.9	5.4	3.5	2.8	2.6	2.3	2.8	3.4	3.1
5	4.3	3.9	3.7	4.7	5.0	3.4	3.2	2.7	2.4	2.8	3.3	3.4
6	6.2	4.8	3.5	4.6	4.7	3.2	3.1	2.7	2.4	2.8	3.3	3.2
7	6.2	4.9	3.5	4.9	4.6	3.2	2.8	2.6	2.4	2.6	3.2	3.1
8	6.3	4.9	3.5	5.1	6.4	3.2	2.9	2.7	2.5	2.6	3.2	4.2
9	4.0	4.7	3.4	6.8	5.7	3.0	2.7	2.6	2.3	2.5	3.2	3.7
10	3.7	4.8	3.6	6.3	5.6	3.2	2.7	2.6	2.4	2.6	3.2	3.7
11	3.6	4.7	3.6	5.7	5.2	3.3	2.7	2.6	2.4	2.7	3.2	3.3
12	3.6	4.6	3.5	5.4	4.8	3.0	2.6	2.5	2.3	2.7	3.2	3.4
13	5.6	4.7	4.1	5.1	4.7	3.1	2.6	2.5	2.4	2.8	3.3	3.5
14	5.2	4.7	6.4	4.9	4.5	3.0	2.5	2.4	2.3	2.6	3.2	3.6
15	4.4	5.0	6.0	4.5	4.5	2.9	2.6	2.5	2.4	2.7	3.2	3.4
16	4.4	10.7	7.3	5.6	4.4	3.1	2.6	2.5	2.4	2.7	3.2	3.4
17	4.1	6.4	5.5	5.1	4.2	3.3	2.5	2.4	2.3	2.6	3.2	3.3
18	3.9	5.6	4.8	4.8	4.0	3.0	2.6	2.6	2.2	2.6	3.2	3.4
19	3.9	4.8	4.9	5.0	3.9	3.0	2.5	2.5	2.2	2.5	3.3	3.9
20	3.7	4.4	5.1	5.2	3.8	2.9	2.7	2.5	2.3	2.6	3.2	3.6
21	3.7	4.1	4.4	4.8	3.8	2.8	2.6	2.4	2.3	2.6	3.2	3.4
22	3.7	4.2	4.6	4.7	3.8	2.8	2.5	2.4	2.2	2.5	3.1	3.4
23	3.7	3.7	4.5	4.6	5.3	2.8	2.6	2.5	2.3	2.6	3.1	3.5
24	3.5	3.6	5.3	4.4	4.8	2.7	2.5	2.4	2.3	2.5	3.1	3.3
25	3.4	3.6	6.4	4.4	4.5	2.8	3.6	2.5	2.4	2.5	3.1	3.5
26	3.8	3.6	5.5	4.4	4.3	2.9	3.9	2.4	2.3	2.5	3.1	3.3
27	3.7	4.1	6.2	4.2	4.1	2.7	3.2	2.4	2.2	3.1	3.1	3.2
28	3.5	3.9	7.9	4.5	4.0	2.8	3.1	2.5	2.3	3.5	3.1	3.5
29	3.5	3.1	9.2	4.5	3.9	2.7	2.9	2.4	2.8	5.2	3.1	3.4
30	3.2	......	7.5	4.2	3.8	2.6	2.9	2.4	3.4	4.4	3.0	3.3
31	3.9	......	6.4	.....	3.9	......	2.8	2.4	......	4.0	.....	3.4

NOTE.—Ice conditions Jan. 6 to 8, Jan. 31 to Feb. 15, Mar. 2 to 3 and Dec. 4 to 31.

Current-meter Discharge Measurements of East Branch, Delaware River, at Hancock, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1908.					
Sept. 4...	C. R. Adams........................	2.34	178	242	90.5
Sept. 27...	C. R. Adams........................	2.27	178	248	69.7
Oct. 23...	Wood and French..................	2.52	259	362	162

Rating Table for East Branch, Delaware River, at Hancock, N. Y., for 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
2.20	53	3.50	970	4.80	3,470	6.20	7,365
2.30	80	3.60	1,110	4.90	3,710	6.40	8,025
2.40	113	3.70	1,260	5.00	3,960	6.60	8,730
2.50	153	3.80	1,420	5.10	4,215	6.80	9,460
2.60	198	3.90	1,590	5.20	4,475	7.00	10,210
2.70	248	4.00	1,770	5.30	4,740	7.20	10,980
2.80	304	4.10	1,960	5.40	5,010	7.40	11,760
2.90	367	4.20	2,150	5.50	5,285	7.60	12,560
3.00	440	4.30	2,350	5.60	5,565	7.80	13,360
3.10	525	4.40	2,560	5.70	5,850	8.00	14,200
3.20	620	4.50	2,780	5.80	6,140	8.20	15,040
3.30	725	4.60	3,000	5.90	6,435	8.40	15,920
3.40	840	4.70	3,230	6.00	6,735		

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on 3 discharge measurements made during 1908, and on the form of earlier rating curves. It is well defined below gage height 8 feet. Above gage height 4.0 feet the table is the same as that for 1906.

Daily Discharge, Second-feet, of East Branch, Delaware River, at Hancock, N. Y.

DAY.	Nov.	Dec.
1908.		
1	1,260	440
2	1,110	440
3	840	367
4	840	.....
5	725	.....
6	725	.....
7	620	.....
8	620	.....
9	620	.....
10	620	.....
11	620	.....
12	620	.....
13	725	.....
14	620	.....
15	620	.....
16	620	.....
17	620	.....
18	620	.....
19	725	.....
20	620	.....
21	620	.....
22	525	.....
23	525	.....
24	525	.....
25	525	.....
26	525	.....
27	525	.....
28	525	.....
29	525	.....
30	440	.....
31	.....	.....

a Ice conditions; discharge estimated.

Monthly Discharge of East Branch, Delaware River, at Hancock, N. Y.
[Drainage area, 920 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	5,560	620	1,830	1.99	2.29
February	27,800	.....	2,370	2.58	2.78
March	19,700	840	4,680	5.09	5.87
April	9,460	2,150	4,040	4.39	4.90
May	8,020	1,420	3,390	3.68	4.24
June	1,590	198	546	.593	.66
July	1,590	153	362	.393	.45
August	304	113	167	.182	.21
September	340	53	125	.136	.15
October	4,480	153	529	.575	.66
November	1,260	440	655	.712	.79
December	.....	.....	350	.380	.44
The year	27,800	53	1,590	1.73	23.44

NOTE.—Discharge during the periods of ice conditions determined from Delaware river at Port Jervis and West Branch, Delaware river, at Hancock.

Discharge Jan. 6 to 8, 1,500 second-feet. Discharge Jan. 31, 620 second-feet. Discharge Feb. 1 to 15, 573 second-feet. Discharge March 2 to 3, 1,000 second-feet. Discharge Dec. 4 to 31, 343 second feet.

WEST BRANCH, DELAWARE RIVER, AT HANCOCK, N. Y.

This station was established October 15, 1902, by Robert E. Horton, and has since been maintained by the U. S. Geological Survey in coöperation with this Department. It is located one-half mile west of the Erie railroad station at Hancock, N. Y., and about one mile above the mouth of East branch.

The channel is straight for 400 feet above and 800 feet below the bridge. The current is swift. Both banks are high and rocky and are not subject to overflow. The bed of the stream is composed of earth and cobblestones.

Discharge measurements are made from the down-stream side of the bridge, at which the gage is located. The bridge has a single span of 235 feet. The initial point for soundings is the top of the face of the left abutment on the down-stream side. The bridge floor is marked at intervals of five feet with black paint.

The original wire gage was attached to the up-stream side of the bridge. It was replaced July 20, 1903, by a standard chain gage. The location and the gage datum were not changed. The length of the chain from the end of the weight to the marker is 30.44 feet. The gage is read twice each day by David Pulver, the collector of tolls at the bridge. The bench-mark is a circular chisel draft on the up-stream corner of the left abutment. Its elevation is assumed at 100.00. The elevation of the top of the pulley is 106.29. The elevation of water-surface, when the gage reads zero, is 75.75.

Mean Daily Gage Height, in Feet, of West Branch, Delaware River, at Hancock, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	5.1	4.2	7.1	5.9	5.1	3.7	2.7	2.9	2.4	3.0	3.4	3.1
2	4.9	5.1	7.6	5.6	5.5	3.6	2.6	2.6	2.4	2.9	3.2	2.9
3	4.5	5.2	7.7	6.0	5.7	3.4	2.4	2.6	2.3	2.7	3.1	3.6
4	4.2	5.0	4.2	5.9	5.5	3.3	3.4	2.5	2.3	2.5	3.1	2.7
5	4.3	5.5	4.0	4.4	5.0	3.1	3.2	2.7	2.3	2.9	3.0	3.2
6	3.5	5.2	3.9	4.7	4.9	3.2	3.1	2.6	2.3	2.7	3.1	3.0
7	3.6	5.0	3.8	4.7	4.8	3.1	3.0	2.6	2.4	2.6	3.1	3.2
8	3.9	5.1	3.9	4.7	7.1	3.2	2.9	2.7	2.3	2.6	3.1	3.7
9	4.0	5.0	3.7	6.7	6.6	3.2	2.9	2.7	2.4	2.6	3.1	4.5
10	3.9	4.9	3.9	6.0	6.2	3.0	2.9	2.6	2.5	2.7	3.0	3.8
11	6.6	4.7	3.5	5.6	5.8	3.1	2.9	2.6	2.5	2.8	3.1	3.8
12	5.0	4.8	3.8	5.3	5.4	3.1	2.8	2.6	2.5	2.4	3.1	4.5
13	5.7	4.8	5.4	5.0	5.1	3.1	2.7	2.5	2.5	2.5	3.4	4.5
14	5.3	4.7	8.0	4.9	4.8	3.1	2.7	2.6	2.5	2.6	3.2	4.6
15	4.5	6.4	7.2	4.5	5.0	3.0	2.6	2.5	2.4	2.7	3.0	4.7
16	4.5	10.4	7.7	5.4	4.9	3.0	2.7	2.7	2.4	2.7	3.0	4.5
17	4.1	6.4	6.0	5.0	4.6	3.1	2.7	2.6	2.3	2.7	3.1	4.4
18	3.9	5.1	5.2	4.8	4.4	3.1	2.7	2.7	2.3	2.6	3.0	4.2
19	3.9	4.6	5.3	5.1	4.2	2.8	2.7	2.7	2.3	2.3	3.1	4.2
20	3.9	4.0	5.1	5.0	3.9	2.8	2.7	2.5	2.3	2.5	3.0	4.4
21	3.5	3.6	4.4	5.0	4.1	2.9	2.6	2.4	2.3	2.4	3.1	4.5
22	3.9	4.1	4.5	4.8	4.1	2.8	2.7	2.4	2.3	2.4	3.1	4.3
23	3.8	3.8	4.6	4.7	4.2	2.7	2.6	2.6	2.3	2.4	3.0	4.1
24	3.5	3.5	6.0	4.6	4.3	2.7	2.6	2.5	2.3	2.5	3.2	4.1
25	3.2	3.8	6.6	4.3	4.0	2.7	3.0	2.5	2.3	2.5	3.0	4.3
26	3.4	3.5	5.7	4.3	3.9	2.7	3.4	2.5	2.3	2.4	3.2	4.5
27	3.9	4.3	6.7	4.3	3.9	2.7	3.2	2.4	2.3	3.1	3.1	4.3
28	3.9	4.0	7.5	4.5	3.8	2.8	3.1	2.4	2.3	2.8	3.1	4.3
29	3.9	5.4	8.4	4.5	3.7	2.6	2.9	2.4	3.0	3.8	3.1	4.1
30	3.8	......	7.4	4.2	3.5	2.5	2.8	2.4	3.1	4.0	3.0	3.9
31	3.7	......	6.4	......	3.9	......	2.7	2.4	......	3.7	......	4.3

NOTE.— Ice conditions Jan. 11, Feb. 1 to 15, Feb. 29 to Mar. 3, Dec. 3 and Dec. 5 to 31.

Current-meter Discharge Measurements of West Branch, Delaware River, at Hancock, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
1908.		*Feet.*	*Feet.*	*Square feet.*	*Second-feet.*
Sept. 3	C. R. Adams	2.38	185	188	40.0
Sept. 4	C. R. Adams	2.42	185	185	29.5
Sept. 26*a*	C. R. Adams	2.39	60	28.3	45.6
Oct. 23	Wood and French	2.59	180	236	86.3

a Wading Measurement.

Rating Table for West Branch, Delaware River, at Hancock, N. Y., for 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*		
2.30	28	3.50	526	4.70	1,970	6.00	4,700
2.40	43	3.60	605	4.80	2,130	6.20	5,230
2.50	63	3.70	690	4.90	2,300	6.40	5,780
2.60	88	3.80	785	5.00	2,470	6.60	6,340
2.70	117	3.90	890	5.10	2,650	6.80	6,920
2.80	150	4.00	1,000	5.20	2,840	7.00	7,510
2.90	187	4.10	1,120	5.30	3,040	7.20	8,120
3.00	228	4.20	1,250	5.40	3,250	7.40	8,740
3.10	273	4.30	1,380	5.50	3,470	7.60	9,380
3.20	324	4.40	1,520	5.60	3,700	7.80	10,020
3.30	383	4.50	1,660	5.80	4,190	8.00	10,680
3.40	450	4.60	1,810				

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on discharge measurements made during 1902 to 1908, and is well defined below gage height 9 feet. Above gage height 4.0 feet the table is the same as that for 1906.

Daily Discharge, Second-feet, of West Branch, Delaware River, at Hancock, N. Y.

DAY.	Jan.	Feb.	March.	April.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	2,650		a1,000	4,440	2,650	690	117	187	43	228	450	273
2	2,300		a1,000	3,700	3,470	605	88	88	43	187	324	187
3	1,660		a1,000	4,700	3,940	450	42	88	28	117	273	a200
4	1,250		1,250	4,440	3,470	385	450	63	28	63	273	117
5	1,380		1,000	1,520	2,470	273	324	117	28	187	228	
6	526		890	1,970	2,300	324	272	88	28	117	273	
7	605		785	1,970	2,130	273	228	88	43	88	273	
8	890		890	1,970	7,810	324	187	117	28	88	272	
9	1,000		690	6,630	6,340	324	187	117	43	88	273	
10	890		890	4,700	5,230	228	187	88	63	117	228	
11	a800		26	3,70	4,190	273	187	88	63	150	273	
12	2,470		85	3,040	3,250	273	150	88	63	43	273	
13	3,940		50	2,470	2,65	273	117	63	63	6	450	
14	3,040		00	2,300	2,130	273	117	88	63	8	324	
15	1,660	a?	20	1,660	2,470	228	88	63	43	11	228	
16	1,660	19	00	3,250	2,300	228	117	117	43	11	228	
17	1,120	[illegible]	00	2,470	1,810	273	117	88	28	117	273	
18	890	2	40	2,130	1,520	273	117	117	28	8	228	
19	890	1	40	2,650	1,250	150	117	117	28	2	273	
20	890	1	50	2,470	890	150	117	63	28	63	228	
21	526		20	2,470	1,120	187	88	43	28	43	273	
22	890	1	60	2,130	1,120	150	117	43	28	43	273	
23	785		10	1,970	1,250	117	88	88	28	43	228	
24	526		00	1,810	1,380	117	88	63	28	63	324	
25	324		40	1,380	1,000	117	228	63	28	63	228	
26	450		40	1,380	890	117	450	63	28	43	324	
27	890	1	30	1,380	890	117	324	43	28	273	273	
28	890	1	60	1,660	785	150	273	43	28	150	273	
29	890		00	1,660	690	88	187	43	228	785	273	
30	785		40	1,250	526	63	150	43	273	1,000	228	
31	690		90		890		117	43		690		

a Ice conditions; discharge estimated.

Monthly Discharge of West Branch, Delaware River, at Hancock, N. Y.
[Drainage area, 680 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	3,940	324	1,230	1.81	2.09
February	19,800	...	1,580	2.32	2.50
March	12,700	526	3,870	5.69	6.56
April	6,630	1,250	2,640	3.88	4.33
May	7,810	526	2,350	3.46	3.99
June	690	63	250	.368	.41
July	450	43	175	.257	.30
August	187	43	81.0	.119	.14
September	273	28	51.7	.076	.08
October	1,000	28	173	.254	.29
November	450	228	278	.409	.46
December	....	...	250	.368	.42
The year	19,800	28	1,080	1.58	21.57

NOTE.—Discharge during the periods of ice conditions estimated on the basis of the discharge at Port Jervis and the East Branch, Delaware river, at Hancock.

Discharge Jan. 11, 800 second-feet. Discharge Feb. 1 to 15, 480 second-feet. Discharge Feb. 29, 800 second-feet. Discharge March 1 to 3, 1,000 second-feet. Discharge Dec. 3, 200 second-feet. Discharge Dec. 5 to 31, 258 second-feet.

DELAWARE RIVER AT PORT JERVIS, N. Y.

This station is located at the toll bridge over the Delaware river at Port Jervis. It was established for the United States Weather Bureau by Irving Righter, City Engineer, Port Jervis, N. Y., October 12, 1904.

This station is maintained for the purpose of flood predictions by the Weather Bureau and the records of gage heights are supplied to the Geological Survey for the purpose of determining the regimen of flow of the upper Delaware drainage.

Mongaup river enters the Delaware from the north about 6 miles above the station and Neversink river, also from the north, enters about one mile below the station.

The river section is affected by ice to a greater or less extent each winter.

Considerable difficulty has been experienced in maintaining the datum of the chain gage constant. On September 4, 1908, a careful investigation was made and in order to avoid negative readings a change in the original datum of about 2 feet, as nearly as it could be determined, was made. The new chain length set on this date was 36.47 feet from rivet marker to the end of the weight. The relation between the gage datum and the following bench-marks was determined:

Port Jervis city bench-mark, from which the gage was originally established, is a cross located on the door-sill of the schoolhouse on Thompson street near Water street. Elevation above gage datum, 27.75 feet.

Bench-mark No. 2, top of down-stream left corner of pier of toll bridge. Elevation above gage datum, 29.92 feet.

Bench-mark No. 3, top of right abutment of toll bridge at apex of angle caused by junction of down-stream wing-wall. Elevation above gage datum, 29.02 feet.

The elevation of the datum of the gage is 414.89 feet above mean sea level. A varying correction of from +1.7 to +2.0 feet has been applied to gage heights prior to September 4, 1908, as given below.

Conditions of flow at this point are constant and a good rating table has been developed for low and medium stages. Careful comparisons of this station with the Riegelsville and the two Hancock stations indicate that the corrections applied to the gage

heights were essentially correct and that the discharge data can be fully relied on.

The maximum flood crest discharge at this station occurred October 10, 1903, and is estimated to have been about 155,000 second-feet, or 47.7 second-feet per square mile. The crest stage was equivalent to 23.3 feet on the gage and is believed to have been the highest stage caused by free flow without ice for more than a century. A stage of 25.5 feet was recorded in March, 1904, due to an ice gorge. The lowest mean discharge for a period of one week since the establishment of the station occurred September 20–26, 1908, and averaged 212 second-feet.

Mean Daily Gage Height, in Feet, of Delaware River at Port Jervis, N. Y.

DAY.	Oct.	Nov.	Dec.
1904.			
1	......	3.3	3.1
2	......	3.2	3.1
3	......	3.1	3.1
4	......	3.0	3.1
5	......	3.0	2.9
6	......	2.9	2.8
7	......	2.8	2.6
8	......	2.9	2.6
9	......	2.8	2.6
10	......	2.8	2.5
11	......	2.7	2.5
12	......	2.7	2.5
13	2.7	2.7	2.7
14	3.8	2.9	2.9
15	3.7	2.8	2.6
16	3.3	2.8	3.1
17	3.1	2.8	2.8
18	3.0	2.9	2.8
19	2.9	2.8	2.9
20	2.8	2.8	2.9
21	3.0	2.8	2.7
22	10.7	3.6	2.9
23	7.5	3.2	2.7
24	6.1	4.0	2.8
25	5.3	3.8	3.1
26	4.7	3.8	3.6
27	4.5	3.6	3.7
28	4.2	3.3	3.8
29	3.9	3.1	7.5
30	3.5	3.1	5.6
31	3.4	......	5.0

NOTE.— Ice conditions in left channel from about December 13 to 28.

Mean Daily Gage Height, in Feet, of Delaware River at Port Jervis, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1905.												
1	4.5	2.9	.....	8.0	3.2	2.3	1.9	2.6	3.8	2.7	2.8	6.0
2	4.6	2.7	.....	7.0	3.2	2.1	1.9	2.6	3.0	2.6	2.8	4.7
3	4.9	3.3	.....	6.1	3.1	2.1	2.0	2.5	2.9	2.5	2.7	4.6
4	5.0	3.4	.....	5.6	3.0	2.1	3.3	2.4	3.9	2.5	2.6	10.3
5	4.1	3.4	.....	5.4	2.9	2.1	2.8	2.3	5.7	2.7	2.6	7.8
6	4.1	.....	.....	5.6	2.8	2.1	2.4	2.1	4.9	2.6	2.6	6.3
7	5.4	.....	.....	6.2	2.9	2.2	2.2	2.0	4.3	2.5	2.7	5.5
8	9.5	.....	.....	5.8	3.0	3.3	2.1	1.9	3.8	2.3	3.2	5.1
9	7.8	.....	.....	5.4	3.0	3.1	2.1	1.7	3.4	2.2	3.1	4.7
10	6.5	.....	.....	5.1	2.8	2.9	1.9	1.9	3.2	2.2	3.1	4.4
11	5.7	.....	.....	5.0	2.7	2.7	2.1	1.9	2.9	2.1	3.0	4.1
12	5.1	.....	.....	5.0	2.7	2.7	1.9	1.7	4.5	3.2	2.9	3.9
13	5.1	.....	.....	5.3	2.8	2.6	1.9	1.6	5.8	4.5	2.8	3.8
14	5.9	.....	.....	4.9	3.0	2.8	1.8	1.9	4.7	4.1	2.8	3.6
15	4.8	.....	.....	4.6	2.8	2.8	1.8	2.4	4.1	3.8	2.7	3.4
16	4.8	.....	.....	4.5	2.8	2.7	1.9	2.4	3.7	3.2	2.7	3.3
17	4.6	.....	.....	4.2	2.8	2.6	1.9	3.0	3.4	3.0	2.6	3.2
18	3.7	.....	.....	4.1	2.9	2.5	1.9	3.1	3.4	2.9	2.6	2.9
19	3.8	.....	5.1	4.0	2.9	2.1	1.8	2.8	3.4	2.8	2.6	2.9
20	4.0	.....	10.7	3.8	2.8	2.2	1.7	2.4	4.1	2.9	2.5	3.0
21	3.8	.....	9.5	3.9	2.8	2.4	1.6	2.2	4.1	4.1	2.4	3.2
22	3.6	.....	8.5	4.1	2.7	2.4	1.9	2.1	4.9	4.0	2.3	4.1
23	3.4	.....	8.1	4.1	2.7	2.6	1.9	2.1	4.3	3.6	2.3	4.6
24	3.2	.....	7.7	3.8	2.6	2.8	1.7	2.0	3.8	3.3	2.3	4.2
25	3.0	.....	7.8	3.6	2.6	2.8	1.7	2.0	3.6	3.3	2.3	3.7
26	3.0	.....	11.6	3.5	2.5	2.6	1.6	2.1	3.3	3.2	2.3	3.5
27	3.0	.....	10.9	3.5	2.4	2.4	1.7	2.0	3.2	3.1	2.2	3.2
28	3.0	.....	11.0	3.4	2.5	2.3	1.7	1.9	3.0	3.1	2.2	3.1
29	2.7	.....	9.6	3.3	2.4	2.1	1.7	1.9	2.9	3.0	2.4	3.2
30	3.2	.....	9.2	3.3	2.4	2.0	1.7	1.7	2.8	2.9	6.0	3.7
31	3.1	.....	8.8	.....	2.3	.....	2.2	1.9	.....	2.8	.....	3.7

NOTE.— Ice conditions from about January 24 to March 18.

Mean Daily Gage Height, in Feet, of Delaware River at Port Jervis, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.												
1	3.5	3.7	3.7	6.9	3.6	4.2	3.3	3.2	2.6	1.8	3.5	3.3
2	3.1	3.6	3.2	6.2	3.5	4.0	3.5	2.9	2.5	2.0	3.5	3.3
3	3.0	3.5	3.5	5.7	3.5	3.7	3.8	2.7	2.5	2.0	3.4	3.1
4	2.9	3.5	9.1	5.7	3.6	3.6	4.0	3.3	2.4	1.8	3.2	2.7
5	3.4	2.7	9.3	6.2	3.6	3.3	4.1	3.1	2.3	1.8	3.0	2.9
6	4.3	2.8	6.3	7.1	3.5	3.9	3.8	3.0	2.2	2.1	3.0	2.8
7	3.7	2.6	5.6	7.3	3.4	4.5	3.4	2.7	2.0	2.2	3.0	4.9
8	3.3	2.5	5.1	6.3	3.4	4.2	3.1	2.6	1.9	2.1	2.8	5.0
9	3.1	2.4	4.8	5.9	3.4	4.1	2.9	3.5	1.9	2.1	2.7	3.9
10	2.8	.....	4.8	6.9	3.5	3.9	2.8	3.2	1.9	2.2	2.6	3.5
11	2.9	.....	4.4	9.0	3.5	4.9	2.8	2.9	1.8	2.1	2.6	4.1
12	2.8	.....	4.1	8.1	3.5	4.8	2.6	2.7	1.8	2.1	2.8	4.0
13	3.3	.....	4.0	7.1	3.3	4.1	2.4	2.5	1.8	2.1	3.0	3.7
14	3.4	.....	3.7	6.5	3.2	3.8	2.3	2.4	2.0	2.1	3.0	3.6
15	3.6	.....	3.5	7.9	3.2	3.6	2.2	2.3	2.1	2.0	2.9	3.7
16	3.3	.....	3.5	11.4	3.2	3.5	2.2	2.2	2.1	1.9	2.8	3.7
17	3.3	.....	3.3	8.9	3.1	3.7	2.2	2.1	2.1	1.9	2.8	4.3
18	3.2	.....	3.3	7.4	3.3	5.2	2.2	2.2	2.2	1.9	2.9	4.1
19	3.1	.....	3.2	6.5	3.8	6.3	2.3	1.9	2.2	1.9	3.9	3.6
20	3.1	.....	3.2	5.9	3.5	5.7	2.3	1.9	2.2	2.0	6.7	3.3
21	2.9	.....	2.9	5.5	3.3	5.5	2.3	1.9	1.9	5.2	5.9	3.2
22	3.3	.....	3.0	5.1	3.1	4.7	3.3	2.0	2.3	4.7	5.7	4.0
23	5.7	5.7	2.9	4.8	2.9	4.4	3.5	2.9	2.2	4.0	5.3	3.8
24	6.3	5.1	2.7	5.1	2.9	4.1	3.5	2.8	2.1	3.7	4.8	3.3
25	6.7	5.0	2.7	4.7	2.8	3.9	3.2	2.5	2.4	3.6	4.6	2.8
26	5.5	6.2	2.7	4.5	2.7	3.6	2.9	2.4	2.1	4.0	4.1	2.8
27	4.8	5.6	3.0	4.3	2.6	3.3	2.6	2.4	1.9	4.2	4.0	3.0
28	4.7	4.7	4.7	4.1	4.2	3.1	2.5	2.3	1.8	3.8	3.8	3.3
29	4.6	.....	7.4	3.9	5.5	3.0	2.5	3.7	1.8	3.9	3.7	3.3
30	4.1	.....	6.4	3.7	5.4	3.4	2.5	3.3	1.8	3.7	3.5	3.3
31	3.8	.....	6.5	.....	5.6	.....	3.1	2.9	.....	3.5	.....	3.4

NOTE.— River frozen February 10 to 22. It is not probable that ice conditions materially affected the flow at any other period.

Mean Daily Gage Height, in Feet, of Delaware River at Port Jervis, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	9.0	3.4	4.1	5.4	4.2	3.0	2.7	1.5	0.9	3.3	4.8	3.4
2	7.2	3.3	4.3	5.0	4.0	3.0	2.7	1.4	.9	3.2	4.4	3.3
3	5.9	3.4	4.6	4.5	4.0	3.9	2.5	1.5	.8	2.9	5.2	3.3
4	5.5	3.5	4.5	4.3	3.8	3.9	2.3	1.3	.9	2.8	6.6	3.1
5	6.2	3.2	4.1	4.1	4.1	3.7	2.2	1.4	1.3	3.3	5.8	2.8
6	5.7	3.3	3.8	3.8	4.1	3.7	2.0	1.3	1.7	4.5	5.3	2.9
7	5.1	2.9	3.9	3.8	3.9	3.7	2.1	1.4	2.2	4.1	8.0	2.8
8	5.1	3.0	4.1	3.6	4.2	3.8	2.1	1.5	1.9	3.7	10.7	2.8
9	6.7	2.9	4.4	3.6	4.4	3.5	2.4	1.4	1.8	4.0	8.2	2.9
10	5.7	2.7	4.3	3.9	4.3	3.4	2.0	1.4	1.6	4.5	6.8	3.9
11	5.2	2.9	4.6	4.0	4.2	3.3	2.0	1.4	1.8	3.9	6.1	13.1
12	4.9	2.9	4.0	3.9	3.9	3.1	1.9	1.3	3.0	3.8	5.6	9.5
13	4.6	.....	4.2	4.2	3.8	3.1	2.1	1.3	3.7	3.5	5.1	7.1
14	4.4	.....	4.4	4.4	3.5	2.9	2.4	1.2	3.2	3.5	4.7	6.1
15	4.4	.....	5.4	4.2	3.6	2.9	2.4	1.1	2.6	3.2	4.4	5.8
16	4.5	4.0	7.2	4.1	3.4	2.8	2.1	1.1	2.2	3.0	4.1	5.4
17	4.3	3.8	6.6	3.8	3.5	2.6	2.0	1.1	2.2	3.0	3.9	5.4
18	3.5	3.9	6.7	3.8	3.9	2.5	1.9	1.2	1.9	2.8	3.7	4.8
19	3.7	4.0	7.3	3.8	3.6	2.4	2.0	1.4	2.0	2.8	3.6	4.4
20	4.3	3.9	5.9	3.6	3.5	2.4	1.8	1.2	1.9	2.5	3.6	4.2
21	6.5	3.8	5.4	3.5	3.4	2.6	2.2	1.1	2.0	2.6	3.6	4.0
22	5.2	4.2	5.7	3.4	3.2	2.6	1.9	1.1	2.0	2.7	3.6	3.9
23	4.3	4.2	7.5	3.3	3.1	2.5	1.9	1.1	2.0	2.7	3.6	3.8
24	4.3	4.0	8.9	3.4	3.0	2.2	1.8	1.2	2.6	2.7	3.6	7.0
25	3.7	3.8	8.0	4.3	3.0	2.3	1.8	1.2	2.9	2.6	3.4	8.4
26	3.8	2.7	7.1	4.7	2.9	2.2	1.7	1.2	2.9	2.5	3.5	6.7
27	3.8	3.2	6.4	4.3	3.0	2.1	1.7	1.2	2.6	2.4	3.6	6.0
28	3.8	4.1	6.4	4.6	3.6	2.2	1.6	1.2	2.3	2.5	3.5	5.4
29	3.6	.....	6.6	4.3	3.3	2.2	1.6	1.1	2.6	6.6	3.4	5.7
30	3.3	.....	6.5	4.1	3.2	2.4	1.5	1.0	3.0	6.5	3.6	5.8
31	3.5	.....	6.0	.....	3.1	.....	1.5	1.0	.....	5.5	.....	5.8

NOTE.— Ice conditions from about January 26 to March 14.

Mean Daily Gage Height, in Feet, of Delaware River at Port Jervis, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	5.7	2.5	3.8	7.1	5.3	3.5	1.5	1.5	0.9	2.3	3.1	1.9
2	5.2	3.1	3.5	6.7	6.6	3.3	1.4	1.5	.9	2.0	2.9	1.8
3	4.8	3.0	3.2	6.4	6.0	3.2	1.6	1.5	.9	1.7	2.7	1.8
4	4.4	5.0	3.4	5.7	5.9	3.0	1.5	1.3	.9	1.6	2.5	1.6
5	4.2	4.8	3.7	5.2	5.4	2.9	2.2	1.3	.9	1.6	2.3	1.6
6	3.8	4.7	3.5	4.9	4.9	2.7	2.2	1.2	.9	1.5	2.3	1.6
7	3.3	4.3	3.2	5.0	4.8	2.6	2.0	1.3	.8	1.5	2.3	1.7
8	3.5	3.9	3.2	5.0	8.1	2.6	1.9	1.3	.7	1.3	2.2	2.2
9	3.8	3.4	3.4	6.1	8.0	2.4	1.8	1.3	.7	1.2	2.2	2.2
10	3.9	3.2	3.2	7.3	7.2	2.3	1.7	1.3	.8	1.2	2.2	2.9
11	3.4	2.7	3.2	6.2	6.4	2.3	1.6	1.3	.8	1.2	2.1	2.4
12	3.4	2.7	3.3	5.6	5.7	2.4	1.5	1.3	.9	1.2	2.1	3.0
13	5.8	3.5	4.1	5.4	5.3	2.2	1.4	1.2	.8	1.3	2.2	2.2
14	6.5	4.8	6.5	5.0	4.9	2.1	1.4	1.2	.8	1.3	2.3	2.3
15	5.6	5.5	9.5	4.7	4.6	2.1	1.4	1.1	.7	1.3	2.3	2.4
16	5.0	13.5	8.8	5.0	5.2	2.3	1.4	1.1	.7	1.3	2.1	2.6
17	4.6	8.5	7.8	5.3	4.5	2.4	1.4	1.1	.7	1.3	2.2	2.6
18	4.2	6.3	6.4	5.1	4.5	2.3	1.4	.9	.8	1.2	2.2	2.4
19	3.9	5.4	6.1	5.1	4.1	2.2	1.2	1.1	.7	1.2	2.1	2.2
20	3.9	4.8	7.0	5.2	3.8	2.1	1.3	1.1	.7	1.1	2.2	2.3
21	3.6	4.3	6.2	5.0	3.7	1.9	1.3	1.1	.7	1.1	2.2	2.4
22	3.5	4.2	5.6	4.7	4.2	1.8	1.3	1.1	.6	1.1	2.3	2.5
23	3.8	4.0	5.6	4.5	4.8	1.8	1.2	1.1	.6	1.1	2.2	2.6
24	3.6	3.6	6.1	4.3	5.6	1.7	1.2	1.0	.7	1.1	2.1	2.3
25	3.5	3.5	8.6	3.9	4.8	1.8	1.3	1.0	.7	1.1	2.1	2.3
26	2.9	3.4	7.2	3.7	4.2	1.7	3.4	1.0	.7	1.1	2.1	2.2
27	3.0	3.9	7.7	3.5	3.9	1.7	3.0	1.1	.7	2.1	2.1	2.2
28	3.6	4.4	9.1	4.2	3.6	1.7	2.5	1.1	.7	2.8	2.0	2.3
29	3.1	4.2	10.8	4.6	3.2	1.6	2.1	1.0	1.4	3.5	2.0	2.3
30	2.8	.....	10.1	4.5	3.0	1.6	1.8	1.0	2.0	4.4	2.0	2.2
31	2.5	.....	8.2	.....	3.8	.....	1.7	1.0	.....	3.7	.....	2.0

NOTE — Discharge probably affected by ice conditions from about Jan. 30 to Feb. 15, and about Dec. 12 to 31.

Current-meter Discharge Measurements of Delaware River at Port Jervis, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Dis-charge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1906.					
Nov. 2...	Hoyt and Cooke	3.49	569	2,680	4,350
Nov. 5...	C. H. Cooke	2.99	568	2,380	3,480
Nov. 10...	C. H. Cooke	2.59	540	2,100	2,440
Nov. 12...	C.H. Cooke	2.79	550	2,240	2,820
Nov. 19...	C. H. Cooke	3.89	590	2,890	7,540
1907.					
Jan. 5...	C. H. Cooke	6.28	605	4,410	15,400
1908.					
May 10...	Henshaw and Barrows	7.08	627	4,850	20,500
May 11...	Henshaw and Barrows	6.27	611	4,310	15,700
Aug. 29*a*..	C. E. Ryder	1.00	503	1,200	407
Sept. 3*a*..	R. H. Bolster	.85	490	1,060	310
Sept. 5*a*..	G. C. Stevens	.89	491	1,080	315
Sept. 20*b*.	K. C. Grant	.69	......	......	226

a Measured from up-stream side of bridge. *b* Left channel measured by wading.

Rating Table for Delaware River at Port Jervis, N. Y., for 1904 *to* 1908.

Gage height.	Discharge.	Gage height	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet*	*Second-feet.*
0.60	175	3.60	4,920	6.50	16,870	9.40	34,860
0.70	225	3.70	5,210	6.60	17,400	9.50	35,560
0.80	280	3.80	5,510	6.70	17,940	9.60	36,260
0.90	340	3.90	5,820	6.80	18,490	9.70	36,960
1.00	400	4.00	6,140	6.90	19,040	9.80	37,670
1.10	465	4.10	6,470	7.00	19,600	9.90	38,380
1.20	540	4.20	6,810	7.10	20,170	10.00	39,100
1.30	625	4.30	7,160	7.20	20,740	10.10	39,820
1.40	720	4.40	7,520	7.30	21,320	10.20	40,540
1.50	820	4.50	7,880	7.40	21,900	10.30	41,270
1.60	930	4.60	8,250	7.50	22,490	10.40	42,000
1.70	1,050	4.70	8,630	7.60	23,090	10.50	42,730
1.80	1,170	4.80	9,020	7.70	23,700	10.60	43,460
1.90	1,300	4.90	9,420	7.80	24,310	10.70	44,200
2.00	1,440	5.00	9,830	7.90	24,930	10.80	44,940
2.10	1,590	5.10	10,250	8.00	25,560	10.90	45,680
2.20	1,750	5.20	10,670	8.10	26,190	11.00	46,420
2.30	1,920	5.30	11,100	8.20	26,820	11.10	47,170
2.40	2,100	5.40	11,540	8.30	27,460	11.20	47,920
2.50	2,290	5.50	11,980	8.40	28,100	11.30	48,670
2.60	2,480	5.60	12,430	8.50	28,750	11.40	49,420
2.70	2,680	5.70	12,890	8.60	29,410	11.50	50,170
2.80	2,890	5.80	13,360	8.70	30,070	11.60	50,930
2.90	3,110	5.90	13,840	8.80	30,740	11.70	51,690
3.00	3,340	6.00	14,320	8.90	31,420	11.80	52,450
3.10	3,580	6.10	14,810	9.00	32,100	11.90	53,210
3.20	3,830	6.20	15,310	9.10	32,780	12.00	53,970
3.30	4,090	6.30	15,820	9.20	33,470	13.00	61,720
3.40	4,360	6.40	16,340	9.30	34,160	13.50	65,660
3.50	4,640						

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on 11 discharge measurements made during 1906 to 1908, and is well defined between gage heights .6 foot and 8.0 feet.

Daily Discharge, Second-feet, of Delaware River at Port Jervis, N. Y.

DAY.	Oct.	Nov.	Dec.
1904.			
1	......	4,090	3,580
2	......	3,830	3,580
3	......	3,580	3,580
4	......	3,340	3,580
5	......	3,340	3,110
6	......	3,110	2,890
7	......	2,890	2,480
8	......	3,110	2,480
9	......	2,890	2,480
10	......	2,890	2,290
11	......	2,680	2,290
12	......	2,680	2,290
13	2,680	2,680	......
14	5,510	3,110	......
15	5,210	2,890	......
16	4,090	2,890	......
17	3,580	2,890	......
18	3,340	3,110	......
19	3,110	2,890	......
20	2,890	2,890	......
21	3,340	2,890	......
22	44,200	4,920	......
23	22,500	3,830	......
24	14,800	6,140	......
25	11,100	5,510	......
26	8,630	5,510	......
27	7,880	4,920	......
28	6,810	4,090	5,510
29	5,820	3,580	22,500
30	4,640	3,580	12,400
31	4,360	......	9,830

Daily Discharge, Second-feet, of Delaware River at Port Jervis, N. Y

Daily Discharge, Second-feet, of Delaware River at Port Jervis, N. Y.

DAY.	Jan.	Feb.	M		Nov.	Dec.
1906.						
1	4,640	5,210	[illegible]		4,640	4,090
2	3,580	4,920	[illegible]		4,640	4,090
3	3,340	4,640	[illegible]		4,360	3,580
4	3,110	4,640	[illegible]		3,830	2,680
5	4,360	2,680	[illegible]		3,340	3,110
6	7,160	2 890	[illegible]		3,340	2,890
7	5,210	2,480	[illegible]		3,340	9,420
8	4,090	2,290	[illegible]		2,890	9,830
9	3,580	2,100	[illegible]		2,680	5 820
10	2,890		[illegible]		2,480	4,640
11	3 110		[illegible]		2,480	6,470
12	2,890		[illegible]		2,890	6 140
13	4 090		[illegible]		3,340	5,210
14	4,360		[illegible]		3,340	4,920
15	4 920		[illegible]		3,110	5,210
16	4,090		[illegible]		2,890	5,210
17	4 090		[illegible]		2,890	7,160
18	3 830		[illegible]		3,110	6,470
19	3 580		[illegible]		5,820	4,920
20	3 580		[illegible]		17,900	4,090
21	3 110		[illegible]		13,800	3,830
22	4 090		[illegible]		12,900	6,140
23	12,900	12,900	[illegible]		11,100	5,510
24	15 800	10,200	[illegible]		9,020	4,090
25	17 900	9 830	[illegible]		8,250	2 890
26	12,000	15,300	[illegible]		6,470	2,890
27	9 020	12,400	[illegible]		6,140	3,340
28	8 630	8,630	[illegible]		5,510	4,090
29	8 250		21	1	5,210	4,090
30	6 470		16	1	4,640	4,090
31	5,510		16	1		4,360

Daily Discharge, Second-feet, of Delaware River at Port Jervis, N. Y.

DAY.	b.	March.	Ap
1907.			
1			11.
2			9.
3			7.
4			7.
5			6.
6			5
7			5.
8			4.
9			4.
10			5,
11			6.
12			5,
13			6,
14			7,
15		11,500	6,
16		20,700	6,
17		17,400	5,
18		17,900	5,
19		21,300	5,
20		13,800	4,
21	[illegible]	11,500	4,
22	10,700	12,900	4,
23	7,160	22 500	4,
24	7,160	31 400	4,
25	5,210	25,600	7 1
26	a5 000	20,200	8,
27	a5 000	16,300	7,1
28	a4,500	16,300	8,2
29	a4,500	17,400	7,1
30	a4,000	16 900	6,4
31	a4,000	14,300	

a Ice conditions, discharge estimated.

Daily Discharge, Second-feet, of Delaware River at Port Jervis, N. Y.

Aug.	Sept.	C
820	340	1
820	340	1
820	340	1
625	340	
625	340	
540	340	
625	280	
625	225	
625	225	
625	280	
625	280	
625	340	
540	280	
540	280	
465	225	
465	225	
465	225	
340	280	
465	225	
465	225	
465	225	
465	175	
465	175	
400	225	
400	225	
400	225	
465	225	1
465	225	2
400	720	4
400	1,440	7
400	....	5

a Discharge probably slightly affected by ice conditions.

Monthly Discharge of Delaware River at Port Jervis, N. Y.
[Drainage area, 3,250 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1904.					
October 13–31	44,200	2,680	8,660	2.66	1.88
November	6,140	2,680	3,560	1.10	1.23
December	22,500	....	4,000	1.23	1.42
1905.					
January	35,600	....	8,380	2.58	2.97
February	....	....	1,200	.369	.38
March	50,900	....	14,800	4.55	5.25
April	25,600	4,090	9,300	2.86	3.19
May	3,830	1,920	2,860	.880	1.01
June	4,090	1,440	2,290	.705	.79
July	4,090	930	1,440	.443	.51
August	3,580	930	1,760	.542	.62
September	13,400	1,440	5,820	1.79	2.00
October	7,880	1,590	3,560	1.10	1.27
November	14,300	1,750	2,950	.908	1.01
December	41,300	3,110	8,140	2.50	2.88
The year	50,900	....	5,210	1.60	21.88
1906.					
January	17,900	2,890	5,940	1.83	2.11
February	15,300	....	4,590	1.41	1.47
March	34,200	2,680	8,780	2.70	3.11
April	49,400	5,210	16,700	5.14	5.74
May	12,400	2,480	4,960	1.53	1.76
June	15,800	3,340	6,840	2.10	2.34
July	6,470	1,750	3,280	1.01	1.16
August	5,210	1,300	2,690	.828	.95
September	2,480	1,170	1,680	.517	.58
October	10,700	1,170	3,190	.982	1.13
November	17,900	2,480	5,540	1.70	1.90
December	9,830	2,680	4,880	1.50	1.73
The year	49,400	....	5,760	1.78	23.98
1907.					
January	32,100	....	9,920	3.05	3.52
February	....	....	2,500	.769	.80
March	31,400	....	10,800	3.32	3.83
April	11,500	4,090	6,430	1.98	2.21
May	7,520	3,110	5,100	1.57	1.81
June	5,820	1,590	3,260	1.00	1.12
July	2,680	820	1,520	.468	.54
August	820	400	595	.183	.21
September	5,210	280	1,830	.563	.63
October	17,400	2,100	5,210	1.60	1.84
November	44,200	4,360	10,400	3.20	3.57
December	62,500	2,890	12,200	3.75	4.32
The year	62,500	280	5,810	1.79	24.40
1908.					
January	16,900	2,290	6,620	2.04	2.35
February	65,700	....	7,920	2.44	2.63
March	44,900	3,830	15,800	4.86	5.60
April	21,300	4,640	10,800	3.32	3.70
May	26,200	3,340	10,600	3.26	3.76
June	4,640	930	1,990	.612	.68
July	4,360	540	1,150	.354	.41
August	820	340	531	.163	.19
September	1,440	175	316	.097	.11
October	7,520	465	1,290	.397	.46
November	3,580	1,440	1,870	.575	.63
December	3,110	930	1,500	.462	.53
The year	65,700	175	5,030	1.55	21.06

NOTE.—Discharge Dec. 13 to 27, 1904, 2,500 second-feet. Discharge Jan. 24 to 31, 1905, 2,310 second-feet. Discharge March 1 to 18, 1905, 1,200 second-feet. Discharge Feb. 10 to 22, 1906, 1,400 second-feet.

Discharge during ice periods, 1907 and 1908 estimated from Delaware river at Riegelsville, N. J., where there was no effect from ice.

Discharge Jan. 26 to 31, 1907, 4,500 second-feet. Discharge March 1 to 14, 1907, 2,000 second-feet. Discharge Feb. 1 to 15, 1908, 2,980 second-feet. Discharge Dec. 12 to 31 1908, 1,520 second-feet.

SUSQUEHANNA RIVER DRAINAGE BASIN.

DESCRIPTION OF SUSQUEHANNA RIVER.

Susquehanna river rises in Otsego lake, in northern Otsego county, N. Y., at an elevation of 1,193 feet above tide and flows in a general southerly direction into Chesapeake bay. Its course is in many places extremely tortuous, crossing the state boundary between New York and Pennsylvania three times. The entire length of the river is about 500 miles, and it drains an area of 27,400 square miles, of which 21,060 square miles lie in Pennsylvania, 6,080 in New York, and 260 in Maryland.

The topography of the basin varies widely in character. In New York the stream and its tributaries flow through a rolling and in places rather broken country, bounded on the north by a mountainous area. In this part of the course its bed is of gravel or sand, with occasional rock ledges, and its banks are moderately high and not extensively subject to overflow. In Pennsylvania the river enters a mountain region, its banks are high, and it winds and twists among the parallel ranges in a bed composed generally of drift materials, gravel, sand and boulders. In the lower part of its course, from Marietta to Havre de Grace, it occupies a broad, deep valley, varying in width from a few hundred feet to more than a mile, and is for the most part bounded on either shore by rocky bluffs and table-lands elevated from 100 to 500 feet above its waters.

SUSQUEHANNA RIVER AT BINGHAMTON, N. Y.

This station was established July 31, 1901, by Robert E. Horton, and has since been maintained by the U. S. Geological Survey in coöperation with this Department. It is located at the Washington street bridge, about 800 feet up-stream from the junction of Chenango and Susquehanna rivers.

On account of the unfavorable conditions produced by a rift, which extends diagonally across the stream underneath the Washington street bridge, discharge measurements are made at the Exchange street bridge, 1,900 feet up-stream.

A standard chain gage is attached to the up-stream side of the left span of the Washington street bridge. The gage is up-stream from the crest of the rift and over a stretch of smooth water extending to the dam, 2,800 feet above. Gage readings are unaffected by backwater from Chenango river at ordinary stages. The gage is read twice each day by William Ray Monroe. The bench-mark is a chisel draft on the corner of the left bridge abutment on the up-stream side. Its assumed elevation is 100.00. The elevation of water-surface, when the gage reads zero, is 76.29.

Mean Daily Gage Height, in Feet, of Susquehanna River at Binghamton, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct	Nov.	Dec.
1907.												
1	8 6	2 75	2.3	4.95	5.85	2.4	2.25	2.15	1.75	2.95	3.85	3.05
2	9 0	2 65	2 3	4.3	5.95	2 45	2.3	2.05	1.8	2 8	3.5	2 95
3	6.15	3 05	2.35	3 95	5 05	2.4	2.35	2.1	1.8	2.6	5.3	2.8
4	7.45	3.5	2.4	3.7	4.9	2.4	2.5	2.05	1.8	2.8	5.65	2.8
5	9 7	2 95	2.2	3.55	4.55	2.45	2.35	2.1	2.1	5.05	4.75	2 45
6	7.4	2.75	2.25	3.45	4.25	2.45	2.2	2.05	2 2	4.75	4.2	2.6
7	6 1	2 95	2 35	3.4	4.15	2 65	2.1	2.0	2.25	4.2	9.1	2.7
8	6.4	2.75	2 05	3.15	4.7	2.9	2.15	2.05	2.3	5.1	9.8	2.6
9	7.15	2.65	2.1	3.25	4.35	2.75	2.1	2.0	2.3	6.9	8.5	2.8
10	6.1	2.35	2.15	3.35	4.25	2.6	2.1	2.05	2.35	5.9	7.1	10 1
11	4.85	2.35	2.2	3.55	4.05	2.5	2.0	2.0	5.35	4.65	5.75	12.55
12	4.3	2.85	2.1	3.45	3.85	2.4	2.1	2.0	5.4	4.7	5.15	10.25
13	3.9	2.6	2.05	3.65	3.55	2.35	2 65	1.9	4.25	4.9	4.5	7.1
14	3 95	2 3	2.15	3.7	3 25	2.25	2.6	1.95	3.4	4.2	4.2	5.75
15	4.45	2.75	3.7	3.75	3.1	2.15	2.45	1.9	2.85	3.8	3.9	5.35
16	4.15	2.3	7.05	3.65	3.05	2.15	2.3	1.8	2.6	3.45	3.55	4.95
17	3.3	2.3	7.05	3.55	3.0	2.15	2.2	1.85	2.5	3.25	3.45	4.7
18	2 9	2.25	7.2	3.45	3.0	2.15	2 2	1.75	2.35	2.85	3 25	4.35
19	3.4	2.2	7 35	3.45	3.05	2.15	2.25	1.6	2.4	2.7	3.2	4.1
20	6.25	2.6	5 9	3.35	3.1	2.15	2.5	1.6	2.3	2.6	3.2	3.8
21	6.9	2.3	4 55	3.15	2.95	2.15	2.45	1.65	2.25	2.65	3.2	3.7
22	4.7	2.45	4.7	3.1	2.75	2.1	2.35	1.65	2.3	2.85	3.1	3.5
23	2.8	2.2	8.0	2.95	2 6	2.1	2.35	1 8	2.45	2.85	3.05	5.1
24	2.9	2.3	8.95	3.25	2.55	2 05	2.4	1.85	2.55	2 65	3.0	10.35
25	2.95	2.45	8.15	5.8	2 45	2.05	2.4	1.9	2.5	2.5	2.95	10.1
26	3.2	2.5	6.9	5.8	2.6	2 0	2.4	1.85	2.5	2.5	2.85	7.4
27	2.9	2.65	6.1	7 95	2 55	2.0	2 5	1.8	2.5	2.5	3.0	6.0
28	3 2	2.55	6.1	7.05	2.7	2.1	2.45	1 75	2.35	3.7	3.0	6.0
29	3.15	......	7.1	6.45	2.7	2.1	2 45	1.8	2.2	5.85	3.15	7.35
30	3.0	......	6.8	6.4	2.65	2.15	2.35	1.85	2 5	5.35	3.1	6.4
31	3.0	......	......	......	2.5	......	2.25	1.75	......	4.35	......	6.6

NOTE.— Ice conditions at this station are largely in the form of anchor ice obstruction. Portions of January to March and December liable to error from this cause. The river has frozen part way across below the gaging station. It seldom freezes over at the gage.

Mean Daily Gage Height, in Feet, of Susquehanna River at Binghamton, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	5.80	2.40	3.05	6.85	5.65	3.05	2.10	2.00	1.80	1.85	2.25	2.05
2	4.95	2.80	3.40	6.45	6.25	2.90	2.05	1.90	1.90	1.9	2.1	2.15
3	4.40	3.20	4.35	5.75	6.15	2.75	2.05	1.90	1.80	1.9	2.15	2.05
4	3.95	2.70	5.05	5.15	5.65	2.60	2.10	1.85	1.80	1.7	2.05	1.95
5	3.65	3.05	4.30	4.75	4.90	2.50	2.05	1.90	1.75	1.9	2.05	1.85
6	2.75	2.80	3.65	4.75	4.15	2.50	2.10	1.85	1.60	1.9	2.1	1.85
7	2.90	2.85	3.75	5.20	5.15	2.40	2.20	1.80	1.80	1.9	2.1	2.05
8	3.10	2.85	3.45	4.85	7.90	2.35	2.10	1.85	1.80	1.9	1.95	2.05
9	3.45	3.05	3.15	7.45	8.15	2.20	2.10	1.80	1.85	1.95	2.05	2.05
10	3.45	2.80	3.05	6.95	7.75	2.30	2.05	1.80	1.80	2.0	2.05	2.25
11	3.10	3.10	2.95	6.15	6.55	2.20	1.9	1.85	1.65	1.8	2.9	2.2
12	3.05	2.65	3.45	5.45	5.80	2.40	1.95	1.80	1.60	1.95	2.05	2.1
13	4.55	2.60	5.15	4.90	4.85	2.30	1.95	1.80	1.55	1.9	2.15	2.05
14	4.60	2.55	10.05	4.60	4.50	2.30	2.00	1.80	1.70	1.85	2.15	2.15
15	3 95	9.55	11.55	4.35	5.30	2.30	2.00	1.80	1.65	1.8	2.15	2.25
16	3 55	13.65	12.15	5.70	5.05	2.30	1.95	1.80	1.70	1.8	2.15	2.15
17	3.05	12.40	9.75	5.05	4.55	2.25	1.90	1.85	1.65	1.7	2.1	2.25
18	3.00	8.05	6.95	4.45	4.00	2.20	1.95	1.90	1.65	1.7	2.1	2.15
19	2.95	5.95	6.85	4.65	3.70	2.25	1.90	1.85	1.60	1.9	2.05	2.15
20	2.95	4.85	5.75	5.65	3.35	2.25	1.90	1.80	1.50	1.8	2.1	2.1
21	2.75	4.40	5.05	5.40	3.25	2.20	1.90	1.80	1.70	1.95	2.15	2.3
22	2.85	4.05	4.75	4.75	3.25	2.20	1.90	1.80	1.65	1.8	2.1	2.15
23	2 85	3.75	4.95	4.45	3.15	2.20	1.95	1.75	1.80	1.9	2.15	2.25
24	3.00	3.40	7.10	4.15	3.45	2.10	2.05	1.75	1.65	1.9	2.15	2.05
25	2 80	3.35	8.65	3.85	3.30	2.20	2.75	1.80	1.70	1.65	2.05	2.1
26	2.70	3.25	7.60	3.65	3.05	2.20	2.35	1.80	1.70	1.85	2.05	2.15
27	2 75	3.60	8.85	3.55	2.90	2.15	2.20	1.80	1.55	1.85	2.1	2.2
28	2.95	3.85	10.30	3.90	2 80	2.10	2.05	1.80	1.75	2.05	2.05	2.05
29	2.75	3.45	11.85	3.75	2.70	2.05	2.10	1.80	1.90	2.15	2.0	2.05
30	2.85	......	10.85	3.65	2.65	2 05	2.00	1.65	1.85	2.1	2.05	2.0
31	2.45	......	8.35	......	2.75	......	2.00	1.80	......	2.25	......	2.1

NOTE.—Discharge affected by ice conditions, February 1 to 14, and during the greater portion of December.

Current-meter Discharge Measurements of Susquehanna River at Binghamton, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1907.					
June 20...	Wood and Hoyt......................	2.10	300	1,160	1,170

Current-meter Discharge Measurements of Susquehanna River at Binghamton, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1908.					
Sept. 2*a*..	C. R. Adams..........................	1.79	234	275	321
Sept. 28*a*..	C. R. Adams..........................	1.76	220	277	282
Oct. 21...	Wood and French...................	1.90	274	948	356
Nov. 3...	C. C. Covert..........................	2.15	300	1,010	592

a Not measured at regular section.

Rating Table for Susquehanna River at Binghamton, N. Y., for 1907.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet*	*Feet.*	*Second-feet*	*Feet.*	*Second-feet*	*Feet.*	*Second-feet*
1.50	45	3.00	3,070	4.40	6,650	6.60	13,320
1.60	115	3.10	3,320	4.50	6,920	6.80	13,960
1.70	210	3.20	3,570	4.60	7,190	7.00	14,600
1.80	335	3.30	3,820	4.70	7,460	7.20	15,260
1.90	500	3.40	4,070	4.80	7,730	7.40	15,920
2.00	700	3.50	4,320	4.90	8,000	7.60	16,590
2.10	920	3.60	4,570	5.00	8,280	7.80	17,270
2.20	1,150	3.70	4,820	5.20	8,880	8.00	17,950
2.30	1,380	3.80	5,080	5.40	9,495	9.00	21,500
2.40	1,610	3.90	5,340	5.60	10,120	10.00	25,100
2.50	1,850	4.00	5,600	5.80	10,760	11.00	28,700
2.60	2,090	4.10	5,860	6.00	11,400	12.00	32,300
2.70	2,330	4.20	6,120	6.20	12,040	13.00	35,950
2.80	2,570	4.30	6,380	6.40	12,680	14.00	39,720
2.90	2,820						

The above table is not applicable for ice or obstructed channel conditions. It is based on measurements made during 1901-1908. Well defined below 6.0 feet. Above 6.0 feet the rating curve is based on one measurement at gage height 16.33 feet.

Daily Discharge, Second-feet, of Susquehanna River at Binghamton, N. Y.

DAY.	y.	Aug.	Sept.	Oct.	Nov.	Dec.
1906.						
1	20	700	335	418	1,260	
2	10	500	[illegible]	500	920	
3	10	500	335	500	1,040	
4	20	418	335	210	810	
5	10	500	272	500	810	
6	20	418	115	500	920	
7	50	335	335	500	920	
8	20	418	335	500	600	
9	20	335	418	600	810	
10	10	335	335	700	810	
11	00	418	162	335	920	
12	00	335	115	600	810	
13	00	335	80	500	1,040	
14	00	335	210	418	1,040	
15	00	335	162	335	1,040	
16	00	335	210	335	1,040	
17	00	418	162	210	920	
18	00	500	162	210	920	
19	00	418	115	500	810	
20	00	335	45	335	920	
21	00	335	210	600	1,040	
22	00	335	162	[illegible]	920	
23	00	272	335	500	1,040	
24	10	272	162	500	1,040	
25	50	335	210	162	810	
26	00	335	210	418	810	
27	50	335	80	418	920	
28	10	335	272	810	810	
29	20	335	500	1,040	700	
30	00	162	[illegible]	920	810	
31	00	335	....	1,260	..	

NOTE.—Discharge may have been slightly affected by ice conditions during the last week of January.

Monthly Discharge of Susquehanna River at Binghamton, N. Y.
[Drainage area, 2,400 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1907.					
January	24,000	2,570	8,740	3.64	4.20
February	4,320	1,150	1,840	0.769	0.80
March	21,300	810	7,840	3.27	3.77
April	17,800	2,940	6,210	2.59	2.89
May	11,200	1,730	4,530	1.89	2.18
June	2,820	700	1,360	0.567	0.63
July	2,210	700	1,440	0.600	0.69
August	1,040	115	523	0.218	0.25
September	9,500	272	2,180	0.908	1.01
October	14,300	1,850	5,230	2.18	2.51
November	24,400	2,700	7,080	2.95	3.29
December	34,300	1,730	10,500	4.38	5.05
The year	34,300	115	4,790	2.00	27.27

Monthly Discharge of Susquehanna River at Binghamton, N. Y.
[Drainage area, 2,400 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	10,800	1,730	3,990	1.66	1.91
February	38,400	....	6,830	2.85	3.07
March	32,800	2,940	13,500	5.62	6.48
April	16,100	4,440	8,480	3.53	3.94
May	18,500	2,210	7,510	3.13	3.61
June	3,200	810	1,450	.604	.67
July	2,450	500	820	.342	.39
August	700	162	374	.156	.18
September	500	45	243	.101	.11
October	1,260	162	505	.210	.24
November	1,260	600	909	.379	.42
December	....	....	500	.208	.24
The year	38,400	45	3,760	1.57	21.26

NOTE.—Discharge during frozen periods estimated on the basis of the discharge of adjacent areas. It is only roughly approximate. Discharge Feb. 1 to 14, 1,600 second-feet.

SUSQUEHANNA RIVER AT COLLIERSVILLE, N. Y.

A temporary low-water station was established September 7, 1908, by C. Robert Adams at the dam of the Oneonta and Mohawk Railroad Company about one-half mile up-stream from Colliersville. The drainage area at this point is 360 square miles, as shown on the Post Route map.

The channel is straight for about 100 feet up-stream and for 200 feet down-stream. The right bank rises gradually and never overflows. The left bank is of medium height and is subject to overflow. The bed is of clay and rocks. There is one channel at all stages. The velocity is always good.

Discharge measurements may be made by wading near the gage during low water. During high water they may be made at the Delaware and Hudson railroad bridge about one-half mile down-stream.

A vertical staff gage which is read twice daily by A. C. Choate, Superintendent of the Oneonta and Mohawk Railroad Company, is fastened near the left bank just below the power station. It is referred to the following bench-mark: Spike about 10 feet above river head in tree to which gage is fastened; elevation, 11.43 feet above zero of gage.

The station is maintained by the U. S. Geological Survey in coöperation with this Department.

The results of gagings at this place in 1907 are given in the State Engineer's report for 1907, pp. 579–580.

Daily Gage Height, in Feet, of Susquehanna River at Colliersville, N. Y.

DAY.	Sept.	Oct.	Nov.	Dec.
1908.				
1	......	3.10	3.00	3.10
2	......	3.10	3.00	3.10
3	......	3.10	3.00	3.10
4	......	3.10	3.00	3.10
5	......	3.10	3.00	3.10
6	......	3.10	3.00	3.10
7	3.10	3.10	3.00	3.10
8	3.10	3.10	3.00	3.10
9	3.15	3.10	3.00	3.10
10	3.15	3.10	3.00	3.10
11	3.15	3.10	3.10	3.15
12	3.15	3.10	3.00	4.15
13	3.15	3.10	3.10	3.15
14	3.15	3.10	3.10	3.15
15	3.15	3.10	3.10	3.15
16	3.15	3.10	3.10	3.15
17	3.12	3.05	3.10	3.10
18	3.10	3.05	3.10	4.10
19	3.10	3.05	5.10	3.10
20	3.10	3.05	3.10	3.10
21	3.10	3.05	3.10	3.15
22	3.10	3.10	3.10	3.10
23	3.10	3.10	3.10	3.10
24	3.10	3.10	3.10	3.10
25	3.10	3.10	3.10	3.10
26	3.10	3.10	3.10	3.10
27	3.10	3.10	3.10	3.20
28	3.10	3.05	3.10	3.20
29	3.10	3.00	3.10	3.20
30	3.10	3.00	3.10	3.20
31	......	3.00	......	3.20

Current-meter Discharge Measurements of Susquehanna River at Colliersville, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1908.					
Sept. 7...	C. R. Adams........................	3.11	26.0	21.6	14.1
Oct. 1...	C. R. Adams........................	3.15	27.5	21.0	14.5

Rating Table for Susquehanna River at Colliersville, N. Y., for 1908.

GAGE HEIGHT.	Discharge.
Feet.	*Second-feet.*
3.00................................	11
3.10................................	14
3.20................................	17

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on 2 discharge measurements made during 1908 and is approximate.

Daily Discharge, Second-feet, of Susquehanna River at Colliersville, N. Y.

DAY.	Sept.	Oct.	Nov.	Dec.
1908.				
1	......	106	11	14
2	......	91	11	14
3	......	106	11	14
4	......	106	11	14
5	......	14	11	14
6	......	14	11	14
7	14	91	11	14
8	60	14	11	14
9	16	14	181	14
10	108	14	11	14
11	16	14	14	16
12	16	160	11	222
13	16	106	14	16
14	16	14	14	16
15	16	14	14	16
16	16	14	14	16
17	15	12	14	14
18	14	12	14	234
19	14	12	246	14
20	14	12	14	14
21	14	12	14	16
22	14	14	14	14
23	14	14	14	14
24	14	14	14	14
25	14	14	14	14
26	14	14	14	14
27	14	153	14	17
28	14	12	14	17
29	14	11	14	17
30	14	11	14	17
31	......	11	......	164

Monthly Discharge of Susquehanna River at Colliersville, N. Y.

[Drainage area, 360 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
September 7-30	108	14	20.5	.057	.05
October	160	11	39.4	.109	.13
November	246	11	26.3	.073	.08
December	234	14	33.4	.093	.11

NOTE. The ordinary gage height during the time of maintenance of this station in 1908 varied from about 3.0 to 3.2 feet and the discharge within these limits is well defined. It represents practically leakage by the plant.

On days when the wheels were running at the power station the discharge has been computed from the number of hours the wheels were run, adding this to the leakage as shown by the gage height for the day. Gage heights observed on November 19, December 12, and December 18 have not been used in computations, but the leakage for these days was assumed as 14 second-feet.

The estimates of monthly discharge at this station are considered as fair.

CHENANGO RIVER AT BINGHAMTON, N. Y.

Chenango river rises in central Madison county, N. Y., in the towns of Eaton and Madison, flows southward, and unites with the Susquehanna at Binghamton. Its head-water valleys lie at an elevation of about 1,200 feet above tide. The elevation of its mouth above tide is 864 feet. Its length is, approximately, 70 miles and its drainage area is 1,580 square miles.

The gaging station, which was established July 31, 1901, by Robert E. Horton, has since been maintained by the U. S. Geological Survey in coöperation with this Department. It is located at the Court street bridge, Binghamton.

The bridge to which the gage is attached stands squarely across the stream at a point where there is a good bed of gravel and small cobblestones and a smooth, uniform current. The channel is obstructed by three masonry piers supporting the four spans of the bridge, 79 feet clear width each, the bridge having a total length of 337 feet between abutments. A small rift between the station and the confluence of Chenango river with the Susquehanna, about 2,500 feet below, cuts off backwater at ordinary stages of the rivers. For periods during freshets or at times when there is an abnormal rise on one or both streams, either record may be affected by backwater and too great a discharge indicated.

A standard chain gage is attached to the hand-rail of the bridge on the up-stream side of the first span from the right bank. The

gage is read by William Ray Monroe. The bench-mark is a circular chisel draft on the up-stream corner of the bridge-seat on the left abutment. Its assumed elevation is 100.00. The elevation of water-surface, when the gage reads zero, is 65.98.

In estimating the run-off of Chenango river, the area directly tributary to storage reservoirs, from which diversion is made to supply Erie canal, has been deducted from the total natural drainage area. The diversion area of six reservoirs at the head of Chenango river, whose outflow is turned into Erie canal through Oriskany creek, is about 30 square miles. The diversion area of De Ruyter reservoir, at the head of Tioughnioga river, whose outflow is turned into Erie canal through Limestone creek, is 18.2 square miles. These two areas have been subtracted from the natural drainage area of 1,580 square miles, giving an effective area of 1,532 square miles. This estimate is approximate, as no allowance for direct inflow to feeder channels from additional areas, nor for waste into the original stream, has been made. The gross area, from which more or less run-off is diverted, is about 105 square miles.

Mean Daily Gage Height, in Feet, of Chenango River at Binghamton, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1907.												
1	12.65	6.15	5.40	8.15	9.70	6.05	6.10	5.60	5.00	6.45	6.80	6.55
2	12.55	6.15	5.40	7.50	9.70	6.05	6.20	5.55	4.95	6.10	6.60	6.45
3	9.70	6.30	5.30	7.35	8.45	6.15	6.50	5.60	5.00	6.00	8.55	6.35
4	11.85	6.85	5.35	7.10	8.35	6.10	6.00	5.70	5.15	6.30	8.95	6.35
5	13.80	6.05	5.45	7.00	8.00	6.05	5.85	5.55	6.00	8.75	8.15	6.00
6	11.00	6.00	5.30	6.95	7.55	6.10	5.65	5.50	6.10	8.05	7.65	6.20
7	9.70	6.20	5.55	6.80	7.45	6.50	5.60	5.40	6.05	7.90	12.65	6.05
8	10.20	5.95	5.30	6.60	8.20	6.75	5.50	5.20	5.85	9.25	13.35	6.05
9	10.80	5.85	5.30	6.85	7.85	6.70	5.45	5.25	5.45	10.65	11.70	6.20
10	9.50	5.70	5.35	7.05	7.70	6.60	5.40	5.25	5.80	9.30	10.30	13.50
11	8.40	5.60	5.40	7.20	7.45	6.30	5.35	5.30	9.10	8.10	8.95	16.00
12	7.90	6.10	5.40	7.15	7.20	6.05	6.40	5.30	9.95	8.50	8.30	13.50
13	7.45	5.90	5.35	7.20	6.90	6.00	6.50	5.25	8.45	8.35	7.80	10.20
14	7.45	5.70	5.50	7.20	6.80	5.90	6.30	5.20	6.70	7.65	7.50	8.95
15	8.00	5.90	7.05	7.05	6.65	5.85	5.90	5.10	6.40	7.35	7.15	8.50
16	7.55	5.65	10.15	6.90	6.70	5.80	5.75	5.15	6.10	6.95	6.90	8.25
17	6.50	6.15	10.35	6.95	6.70	5.80	5.50	5.15	6.00	6.75	6.80	7.95
18	6.50	5.70	10.55	6.95	6.65	5.70	5.55	5.20	5.80	6.60	6.60	7.65
19	6.90	5.60	10.70	6.85	6.65	5.65	5.60	5.20	5.70	6.45	6.65	7.40
20	9.90	6.20	9.15	6.75	6.70	5.65	5.60	5.10	5.70	6.35	6.60	7.00
21	10.20	5.60	7.90	6.60	6.50	5.60	5.65	5.15	5.70	6.60	6.50	7.20
22	7.80	5.75	8.40	6.45	6.30	5.65	5.65	5.10	6.15	6.60	6.55	6.90
23	6.40	5.50	11.90	6.45	6.20	5.65	5.55	5.10	5.95	6.40	6.45	8.30
24	6.20	5.50	12.70	7.25	6.15	5.60	5.60	5.05	6.00	6.25	6.35	14.10
25	6.20	5.40	11.75	9.90	6.05	5.50	5.80	5.05	6.05	6.10	6.35	13.65
26	6.50	5.45	10.45	9.25	6.30	5.35	6.50	5.00	6.05	6.05	6.40	10.75
27	6.30	5.50	9.55	11.90	6.85	5.40	6.35	5.05	5.90	6.00	6.40	9.30
28	6.40	5.40	9.80	10.05	7.05	5.65	6.05	5.05	5.85	7.20	6.40	9.55
29	6.50	.....	10.80	9.70	6.60	5.50	5.60	5.00	5.80	9.00	6.65	11.05
30	6.35	.....	10.10	8.65	6.30	5.60	5.60	4.95	6.35	8.20	6.65	9.80
31	6.25	.....	.....	.....	6.20	.....	5.55	5.00	.....	7.20	.....	10.25

Mean Daily Gage Height, in Feet, of Chenango River at Binghamton, N. Y.

DAY.	Jan.	Feb.	March.	April	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	8.95	5.80	6.40	10.20	9.55	6.85	5.25	5.20	4.95	4.95	5.30	5.25
2	8.15	6.00	6.75	9.90	9.65	6.50	5.20	5.05	5.00	5.00	5.35	5.30
3	7.60	6.45	8.00	9.10	9.45	6.20	5.25	5.25	4.95	4.95	5.30	4.90
4	7.15	5.90	8.40	8.50	8.95	6.05	5.35	5.25	4.95	4.90	5.35	5.20
5	7.05	6.30	7.70	8.20	8.05	5.95	5.20	5.15	4.95	4.95	5.25	5.20
6	6.40	6.00	7.20	8.55	7.50	5.90	5.20	5.25	5.05	4.95	5.20	4.85
7	6.35	6.00	7.10	8.85	8.30	5.85	5.20	5.25	5.05	4.95	5.20	5.20
8	6.50	6.00	6.90	8.40	11.50	5.65	5.20	5.35	5.05	4.95	4.90	5.20
9	6.70	6.10	6.75	10.95	11.20	5.75	5.35	4.95	5.05	4.95	5.30	5.30
10	6.60	6.00	6.65	10.10	10.80	5.85	5.30	5.30	5.05	4.95	5.40	5.25
11	6.40	6.00	6.55	9.30	9.65	5.95	5.25	5.25	5.00	4.90	5.40	5.15
12	6.60	5.80	7.00	8.75	8.85	5.75	5.20	5.20	4.90	4.95	5.35	5.20
13	7.75	5.80	8.50	8.10	7.95	5.65	5.15	5.20	4.90	5.10	5.60	5.10
14	7.95	5.90	13.35	7.90	7.65	5.60	5.30	5.15	5.05	5.05	5.60	5.20
15	7.20	12.00	15.00	7.60	8.55	5.55	5.20	5.25	5.05	5.05	5.40	5.30
16	7.00	17.00	15.65	9.40	8.15	5.55	5.25	5.00	4.95	5.00	5.50	5.30
17	6.50	15.65	13.05	8.40	7.70	5.65	5.20	5.35	4.95	5.00	5.20	5.30
18	6.55	11.40	10.30	7.85	7.20	5.55	5.25	5.05	4.90	4.95	5.30	5.20
19	6.50	9.25	9.90	8.40	6.95	5.45	5.30	5.25	4.95	5.05	5.35	5.30
20	6.25	8.40	8.85	9.30	6.65	5.35	5.25	5.10	4.90	4.95	5.30	5.35
21	6.20	7.80	8.10	8.85	6.55	5.25	5.25	5.25	5.00	4.95	5.35	5.25
22	6.40	7.65	8.00	8.30	6.50	5.25	5.35	5.15	4.95	5.10	5.40	5.20
23	6.75	7.10	8.25	7.90	6.50	5.30	5.75	5.00	4.95	4.90	5.40	5.50
24	6.60	6.80	10.55	7.50	6.75	5.25	5.55	5.30	4.90	4.90	5.30	5.20
25	6.25	6.75	12.25	7.25	6.35	5.40	5.75	5.15	4.95	4.85	5.35	5.15
26	5.80	6.85	11.00	7.10	6.15	5.35	5.80	5.20	4.90	5.10	5.30	5.40
27	6.45	7.00	12.60	6.95	6.45	5.35	5.50	5.10	4.75	5.20	5.35	5.15
28	6.05	7.05	13.95	7.30	6.45	5.20	5.40	5.05	5.00	5.20	5.30	5.25
29	6.25	6.90	15.50	7.20	6.15	5.25	5.40	5.05	5.00	5.30	5.10	5.20
30	6.10	......	14.40	6.95	6.15	5.35	5.35	4.90	4.90	5.40	5.35	5.20
31	5.80	......	11.70	......	6.35	......	5.25	5.10	......	5.35	......	5.25

NOTE.—Ice conditions from about February 1-14 and during the greater portion of December.

Current-meter Discharge Measurements of Chenango River at Binghamton, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
1908.		*Feet.*	*Feet.*	*Square feet.*	*Second-feet.*
Sept. 2...	C. R. Adams	5.05	220	387	165
Sept. 26...	C. R. Adams	4.90	......	......	118
Oct. 21...	Wood and French	4.95	209	405	174
Nov. 2..	C. C. Covert	5.33	288	496	392

Rating Table for Chenango River at Binghamton, N. Y., for 1907 and 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
4.70	35	6.10	1,210	7.50	3,220	9.80	7,140
4.80	70	6.20	1,345	7.60	3,375	10.00	7,500
4.90	115	6.30	1,480	7.70	3,535	10.20	7,860
5.00	170	6.40	1,615	7.80	3,695	10.40	8,220
5.10	235	6.50	1,755	7.90	3,855	10.60	8,590
5.20	305	6.60	1,895	8.00	4,020	10.80	8,970
5.30	380	6.70	2,035	8.20	4,355	11.00	9,350
5.40	460	6.80	2,180	8.40	4,695	12.00	11,250
5.50	550	6.90	2,325	8.60	5,040	13.00	13,250
5.60	645	7.00	2,470	8.80	5,390	14.00	15,300
5.70	745	7.10	2,615	9.00	5,740	15.00	17,400
5.80	850	7.20	2,765	9.20	6,090	16.00	19,500
5.90	960	7.30	2,915	9.40	6,440	17.00	21,700
6.00	1,080	7.40	3,065	9.60	6,790		

The above table is not applicable for ice or obstructed channel conditions. It is based on discharge measurements made during 1901–1908, and is well defined below gage heights 10.0 feet. Above gage height 9.0 feet the rating curve is based on one measurement made at gage height 19.8 feet.

Monthly Discharge of Chenango River at Binghamton, N. Y.
[Drainage area, 1,530 square miles.]

MONTH.	Discharge in Second-feet.			Run-off.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches or drainage area.
1908.					
January	5,650	850	2,130	1.39	1.60
February	21,700	....	3,690	2.41	2.60
March	18,800	1,620	7,680	4.99	5.75
April	9,260	2,400	4,810	3.14	3.50
May	10,300	1,280	4,000	2.61	3.01
June	2,250	305	737	.482	.54
July	850	270	412	.269	.31
August	420	115	282	.184	.21
September	202	52	151	.099	.11
October	460	92	192	.125	.14
November	645	115	405	.265	.30
December	....	92	250	.163	.19
The year	21,700	52	2,060	1.34	18.26

NOTE.—Discharge during the frozen periods estimated on the basis of the discharge of adjacent drainages. It is only roughly approximate. Discharge Feb. 1 to 14, 759 second-feet.

UPPER CHENANGO RIVER AT GREENE, N. Y.

A temporary low-water station was established September 5, 1908, by C. Robert Adams, at the steel highway bridge about three miles above the town of Greene. The drainage area at this point is 538 square miles, as shown on the Post Route map.

The channel is straight for about 200 feet up-stream and for 100 feet down-stream, with a sluggish current. Both banks are high and probably do not overflow. At the bridge the bed is of fine sand or clay.

Discharge measurements may be made from the bridge during high water. During low water they were made from a boat at the opening in an old dam a short distance down-stream.

A vertical staff gage, which has been read twice daily by Benjamin Rounds, is fastened to a pile just below the old dam. It is referred to the following reference point: Top of hand-rail two feet to the west from the first vertical on the down-stream truss from the west end of truss. Distance to water-surface, when gage read 4.60, is 22.75 feet.

Mean Daily Gage Height, in Feet, of Upper Chenango River at Greene, N. Y.

DAY	Sept.	Oct.	Nov.
1908.			
1	......	5.0	5.4
2	......	5.2	5.3
3	......	5.4	5.4
4	......	5.2	5.3
5	4.6	5.0	5.2
6	4.8	5.1	....
7	4.8	5.0	....
8	4.8	4.9	....
9	4.8	4.8	....
10	4.7	4.9	....
11	4.7	5.2	....
12	4.7	5.1	....
13	4.7	5.2	....
14	4.65	5.1	....
15	4.7	5.0	....
16	4.6	5.1	....
17	4.7	5.1	....
18	4.6	5.0	....
19	4.6	4.9	....
20	4.5	4.8	....
21	4.5	4.9	....
22	4.6	4.9	....
23	4.55	4.8	....
24	4.6	4.8	....
25	4.5	4.9	....
26	4.6	5.0	....
27	4.6	5.1	....
28	4.6	5.3	....
29	4.7	5.4	....
30	5.0	5.8	....
31	......	5.5	....

Current-meter Discharge Measurements of Upper Chenango River at Greene, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1908.					
Sept. 5	C. R. Adams	4.60	28	26.6	53.8
Sept. 30	C. R. Adams	5.00	30	43.0	55.3

CHEMUNG RIVER.

DESCRIPTION.

Chemung river is formed at Painted Post, N. Y., by the confluence of Tioga and Cohocton rivers. Cohocton river lies entirely in the state of New York. Tioga river receives, just above its mouth, Canisteo river, a large tributary, which also has its drainage basin in New York to the south of the Cohocton. The drainage area of Tioga river, above the Canisteo, is mainly in Pennsylvania. Chemung river flows southeastward through Corning, Elmira and Chemung, crosses the state line and flows for a short distance in Pennsylvania, then returns to New York, and crosses again to Pennsylvania near Waverly, finally emptying into the

Susquehanna near Athens, Bradford county, Pa. The total length of the river is about 40 miles, of which 30 miles lie in New York; the drainage area, measured at the mouth, is 2,520 square miles.

The topographic features of the basin are, as a rule, bold and broad. The hills rise to a height of several hundred feet on either side, within a short distance of the stream. The upland plateau is to a large extent wooded, has impervious soil, no lake storage, and few marsh areas. Tributaries are ramifying and uniformly distributed, though not very numerous, and dry gullies, or flood channels, are common. The main river is sluggish, with low banks and a broad valley or flood plain, which is often overflowed. The concentration of storm waters from the three large streams, which unite just above Corning, makes possible excessive floods. Dikes have been erected in the cities of Elmira and Corning for protection. One of the highest recorded freshets in the stream occurred June 1, 1889. It was preceded by phenomenal rainfall, aggregating several inches in a few hours during the night of May 31. The discharge at this time has been estimated at 67 second-feet per square mile from 2,055 square miles, or 138,000 second-feet.[a]

CHEMUNG RIVER AT CHEMUNG, N. Y.

The gaging station was established September 7, 1903, by Robert E. Horton. It has since been maintained by the U. S. Geological Survey in coöperation with this Department. It is located at the suspension highway bridge, midway between Chemung, N. Y., and Willawana, Pa., near the state line.

The channel is straight for 700 feet above and 800 feet below the station. The right bank is high, cleared, and not subject to overflow; the left bank is of medium height, wooded, and will overflow at high water. The bed of the stream is composed of gravel and is clean and permanent. The current is good. There is but one channel at all stages.

Discharge measurements are made from the down-stream side of the bridge, which has a single span of 395 feet. The initial point for soundings is the face of the right abutment on the down-stream side.

[a] Report of Francis Collingwood, C. E., on the protection of the city of Elmira, N. Y., against floods.

A standard chain gage is attached to the up-stream side of the bridge, near the right bank, and is read twice each day by Daniel L. Orcutt. The bench-mark is formed by three nails driven into a telephone pole 70 feet to the right of the initial point for soundings and about 30 feet up-stream. The pole is marked with black paint "U. S. G. S. B. M." Elevation of bench-mark is assumed at 100.00. The elevation of water-surface, when the gage reads zero, is 70.12.

The smooth water reaches of the stream become ice-covered in winter. Needle ice forms over the rapids and is carried under the surface ice. Much of the winter flow apparently filters through these beds of needle ice at times. The conditions render the estimation of the daily discharge in winter impracticable.

Mean Daily Gage Height, in Feet, of Chemung River at Chemung, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	5.70	2.97	3.48	6.44	7.33	5.35	2.38	2.36	1.86	1.82	2.13	2.00
2	5.09	2.87	3.42	5.91	7.33	4.57	2.38	2.19	1.87	1.98	2.00	1.85
3	4.51	2.98	5.02	5.46	6.95	4.05	2.35	2.22	1.83	1.86	2.03	1.85
4	5.09	2.66	5.03	5.04	6.09	3.69	2.48	2.17	1.77	1.81	1.98	1.67
5	4.03	2.75	4.54	4.62	5.43	3.48	2.58	2.18	1.80	1.69	1.87	1.86
6	3.37	2.86	4.41	4.49	4.88	3.24	2.71	2.15	1.80	1.81	1.88	1.84
7	3.21	2.88	4.28	4.57	5.01	3.12	2.59	2.19	1.75	1.77	1.92	1.81
8	3.08	2.92	4.35	4.38	8.01	2.98	2.34	2.41	1.75	1.77	1.90	1.92
9	3.38	2.91	4.15	5.51	8.31	2.89	2.21	2.32	1.75	1.78	1.84	1.80
10	3.09	2.73	4.09	5.54	8.45	2.91	2.17	2.41	1.75	1.74	1.86	1.89
11	3.08	2.83	4.08	4.75	7.63	2.92	2.16	2.33	1.75	1.81	1.92	2.04
12	3.32	2.87	6.31	4.55	6.29	2.86	2.05	2.17	1.73	1.71	1.83	1.96
13	6.01	2.78	9.67	4.28	5.45	2.71	2.61	2.17	1.73	1.89	1.89	.....
14	6.33	3.10	13.38	4.13	4.95	2.71	2.65	2.19	1.69	1.86	1.89	.....
15	5.05	5.48	10.67	3.98	5.35	2.63	2.46	2.22	1.66	1.97	1.90	.....
16	4.62	14.75	12.69	4.29	6.35	2.61	2.35	2.07	1.65	1.81	1.86	.....
17	4.12	8.07	8.51	4.40	6.25	2.66	2.27	2.19	1.62	1.93	1.88	.....
18	3.69	6.12	6.82	4.07	5.48	2.53	2.24	2.17	1.68	1.76	1.91	.....
19	3.73	5.23	8.22	4.53	4.93	2.54	2.10	2.56	1.70	1.73	1.91	.....
20	3.51	4.55	7.59	6.53	4.58	2.45	2.17	2.41	1.68	1.89	1.94	.....
21	3.51	4.41	5.99	6.17	4.86	2.35	2.13	2.27	1.64	1.75	1.90	.....
22	3.51	4.13	5.87	5.41	5.18	2.43	2.33	2.21	1.70	1.70	1.87	.....
23	4.18	3.80	6.14	4.91	4.77	2.30	3.82	2.11	1.73	1.80	1.99	.....
24	3.71	3.59	6.85	4.51	4.41	2.43	3.00	2.07	1.69	1.76	2.02	.....
25	2.91	3.42	7.77	4.23	4.08	3.05	4.28	2.03	1.67	1.90	2.02	.....
26	2.70	3.63	6.76	4.05	3.73	2.91	4.64	2.04	1.67	1.77	2.01	.....
27	3.43	4.53	8.03	3.87	3.93	2.65	3.51	1.94	1.68	2.02	1.96	.....
28	3.23	4.23	9.25	4.08	4.48	2.51	3.07	1.95	1.64	2.64	1.92	.....
29	3.08	3.65	10.31	4.13	3.90	2.45	2.73	1.91	1.74	2.49	1.87	.....
30	3.57	.....	9.12	3.79	4.73	2.39	2.59	1.91	1.75	2.28	1.91	.....
31	3.04	.....	7.19	.....	5.90	.....	2.45	1.92	.....	2.26	.....	.....

NOTE.—Ice conditions from about January 27 to February 14 and from about December 11 to 31.

Current-meter Discharge Measurements of Chemung River at Chemung, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1908.					
Sept. 6	C. R. Adams	1.81	183	845	139
Sept. 20	C. R. Adams	1.68	185	867	101

Rating Table for Chemung River at Chemung, N. Y., for 1908.

Gage height.	Discharge	Gage height.	Discharge.	Gage height	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet*	*Feet*	*Second-feet*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
1.60	75	3.20	1,215	4.80	3,820	7.20	9,790
1.70	105	3.30	1,330	4.90	4,030	7.40	10,390
1.80	140	3.40	1,455	5.00	4,240	7.60	11,010
1.90	180	3.50	1,580	5.10	4,460	7.80	11,650
2.00	225	3.60	1,710	5.20	4,680	8.00	12,300
2.10	280	3.70	1,850	5.30	4,900	8.20	12,970
2.20	340	3.80	2,000	5.40	5,130	8.40	13,650
2.30	405	3.90	2,160	5.60	5,590	8.60	14,350
2.40	475	4.00	2,320	5.80	6,060	8.80	15,070
2.50	550	4.10	2,480	6.00	6,550	9.00	15,800
2.60	640	4.20	2,650	6.20	7,070	10.00	19,700
2.70	715	4.30	2,830	6.40	7,590	11.00	24,000
2.80	805	4.40	3,010	6.60	8,130	12.00	28,700
2.90	906	4.50	3,200	6.80	8,670	13.00	33,500
3.00	1,000	4.60	3,400	7.00	9,220	14.00	39,300
3.10	1,105	4.70	3,610				

NOTE. The above table is not applicable for ice or obstructed channel conditions. It is based on discharge measurements made during 1903-1908, and is well defined. Above gage height 3.3 feet the table is the same as that for 1906.

Daily Discharge, Second-feet, of Chemung River at Chemung, N. Y.

DAY	Sept.	Oct.	Nov	Dec.
1908				
1	164	148	298	325
2	168	216	225	160
3	152	164	242	160
4	130	144	216	96
5	140	102	168	164
6	140	144	172	156
7	122	130	189	144
8	122	130	180	189
9	122	133	156	140
10	122	119	161	176
11	122	144	189	
12	116	108	152	
13	116	176	176	
14	102	164	176	
15	93	212	160	
16	90	144	164	
17	81	194	172	
18	99	128	184	
19	105	116	184	
20	99	176	198	
21	87	122	180	
22	105	105	169	
23	116	140	220	
24	102	128	236	
25	96	180	250	
26	96	130	230	
27	99	236	207	
28	87	664	189	
29	119	542	168	
30	122	392	184	
31		379		

a Discharge January 27 to 31 probably affected by ice conditions.

Monthly Discharge of Chemung River at Chemung, N. Y.
[Discharge area, 2,440 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	7,410	715	2,400	.984	1.13
February	42,900	....	3,590	1.47	1.58
March	35,300	1,480	10,300	4.22	4.86
April	7,940	1,980	3,830	1.57	1.75
May	13,800	1,900	6,020	2.47	2.85
June	5,020	405	1,070	.439	.49
July	3,480	252	765	.314	.36
August	598	184	332	.136	.16
September	168	81	115	.047	.05
October	664	102	194	.080	.09
November	298	152	193	.079	.09
December	....	....	137	.056	.06
The year	42,900	81	2,410	.989	13.47

NOTE.—Discharge during frozen periods estimated on the basis of the discharge of adjacent drainages. It is only roughly approximate. Discharge Feb. 1 to 14, 600 second-feet. Discharge Dec. 11 to 31, 125 second-feet.

ALLEGHENY RIVER DRAINAGE BASIN.

DESCRIPTION OF ALLEGHENY RIVER.

Allegheny river, which, with the Monongahela, forms the Ohio at Pittsburg, rises in northern Pennsylvania, flows north into the state of New York, then flows south through western Pennsylvania. The headwaters have an elevation of about 2,500 feet and join those of Genesee river on the north and of the Susquehanna on the east. The total length from the source to the mouth at Pittsburg is about 300 miles, 47 of which are in the state of New York. The principal facts concerning this river have been given in a report by George Lehman, assistant engineer, contained in House Document No. 72, Fifty-fifth Congress, third session. Although this river drains a large area, much of which is of an elevated and even mountainous character, yet it is of comparatively small value for water-power. The total fall in 255 miles, between Olean, N. Y., and the mouth, is only 725 feet, or an average of less than 3 feet per mile. This descent is accomplished without abrupt pitches, and even with few rapids having a fall of much consequence. The drainage basin of Allegheny river above Red House is comparatively rugged and precipitous. It is mostly covered with brush and light forest. A considerable amount of snow accumulates in the winter and feeds the stream until late in

spring. The basin is underlain by shales of the Chemung series, and the depth of soil is usually small, excepting in stream valleys. There are no lakes and no artificial storage tributary to the stream. The Cuba reservoir, which feeds the Erie canal through Genesee river, lies on the divide between the Alleghany and Genesee drainage basins. A part of the overflow from this reservoir passes into the Alleghany, the rest passes into Genesee river. During about half of the year the river is navigable for small steamers to Franklin, 123 miles above Pittsburg.

ALLEGHENY RIVER AT RED HOUSE, N. Y.

This station was established September 4, 1903, by R. E. Horton. It has since been maintained by the U. S. Geological Survey in coöperation with this Department. It is located at the Red House bridge, near the stations of the Erie and Pennsylvania railroads and about 5 miles below Salamanca, N. Y., about 13 miles above the point where the river leaves New York state. At Olean, N. Y., the wasteway from the Cuba reservoir enters the stream through Olean creek. This reservoir is located on the divide between Oil creek, tributary to Allegheny river, and Genesee river. The storage is commonly turned into Genesee river through the abandoned summit level of Genesee Valley canal, but may be diverted into Oil creek through the guard-lock at the head of the canal.

The channel is straight for 800 feet above and below the station, 494 feet wide between abutments, broken by two piers. The current velocity is well distributed. The right bank is high and does not overflow. The left bank overflows only at flood stages. At extreme high water there is an additional flood channel on the left bank. The bed is of gravel and is regular.

Discharge measurements are made from the down-stream side of the bridge. The initial point for soundings is the left end of th down-stream side of the bridge.

A standard chain gage is fastened to the up-stream side of the bridge near the middle of the left span; length of chain, 24.16 feet. The gage is read twice each day by G. H. Smith. The bench-mark is a circle cut on the down-stream side of the left abutment; assumed elevation, 100.00. The elevation of water-surface, when the gage reads zero, is 78.91.

Mean Daily Gage Height, in Feet, of Allegheny River at Red House, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	6.4	4.0	5.3	8.0	5.1	6.2	3.7	3.5	3.0	2.7	2.7	2.7
2	6.1	.....	5.4	7.6	6.0	6.0	3.6	3.5	3.0	2.8	2.7	2.7
3	5.9	.....	5.6	7.4	6.5	5.5	3.6	3.5	2.9	2.8	2.7	2.7
4	5.7	.....	6.4	7.0	6.5	5.1	4.8	3.5	2.9	2.8	2.7	.....
5	5.4	.....	6.3	6.8	6.3	4.8	4.0	3.4	2.9	2.7	2.8	2.7
6	5.1	.....	6.3	6.5	6.4	4.6	3.8	3.4	2.9	2.7	2.8	.....
7	4.8	.....	6.2	6.3	7.2	4.5	3.7	3.4	2.8	2.7	2.8	.....
8	4.6	4.2	6.2	6.4	8.1	4.4	3.6	3.4	2.8	2.7	2.7	.....
9	4.5	.....	6.0	6.4	7.9	4.2	3.4	3.4	2.8	2.7	2.7	.....
10	4.5	.....	5.8	6.3	7.6	4.0	3.3	3.3	2.8	2.7	2.7	.....
11	4.4	.....	5.4	6.3	7.0	3.9	3.2	3.3	2.7	2.7	2.8	.....
12	5.0	.....	5.8	6.2	6.4	3.8	3.2	3.3	2.7	2.7	2.8	2.7
13	6.3	.....	6.2	5.0	6.0	3.6	3.1	3.3	2.7	2.7	2.8	.....
14	5.7	.....	6.3	4.9	5.6	3.5	3.1	3.3	2.7	2.7	2.9	.....
15	5.3	10.2	7.8	4.9	5.8	5.6	3.0	3.2	2.7	2.7	2.8	.....
16	5.0	10.8	11.2	5.1	6.4	5.5	3.0	3.2	2.7	2.7	2.8	.....
17	4.9	9.1	10.0	4.9	6.6	4.5	3.0	4.1	2.7	2.7	2.9	.....
18	4.8	8.9	8.9	4.9	6.4	3.8	3.1	4.3	2.7	2.7	2.9	.....
19	4.7	8.3	8.5	5.3	6.2	3.7	3.1	3.9	2.7	2.7	3.0	3.7
20	4.6	7.8	9.5	7.3	6.0	3.6	3.0	3.4	2.7	2.7	3.0	.....
21	4.6	7.4	8.5	6.4	6.0	3.5	3.5	3.3	2.7	2.7	3.0	.....
22	4.5	7.0	8.0	6.0	5.6	3.5	3.8	3.3	2.7	2.7	3.0	.....
23	4.5	6.6	7.4	5.9	5.4	3.8	4.0	3.3	2.7	2.7	2.9	.....
24	4.4	6.2	6.9	5.8	5.1	6.2	4.8	3.2	2.7	2.7	2.9	.....
25	4.3	5.9	6.5	5.7	5.0	5.6	5.0	3.2	2.7	2.7	2.9	.....
26	.....	5.7	7.2	5.5	5.2	4.5	5.7	3.2	2.7	2.7	2.9	3.4
27	.....	5.6	7.5	5.3	5.6	4.0	5.0	3.1	2.7	2.7	2.8	3.6
28	.....	5.4	8.6	5.2	5.6	3.8	4.5	3.1	2.7	2.7	2.8	3.7
29	.....	5.4	8.6	5.1	6.0	3.7	4.1	3.1	2.7	2.7	2.8	3.7
30	.....	.....	9.0	5.0	6.0	3.7	3.8	3.0	2.7	2.7	2.8	3.6
31	.....	.....	8.6	.....	6.2	.....	3.6	3.0	.....	2.7	.....	3.8

NOTE.—Ice conditions January 26 to February 14 and December 4 to 26.

Current-meter Discharge Measurements of Allegheny River at Red House, N. Y.

DATE.	Hydrographer.	Gage height.	Width.	Area of section.	Discharge.
		Feet.	*Feet.*	*Square feet.*	*Second-feet.*
1908. Oct. 20...	C. R. Adams	2.70	355	840	145

Rating Table for Allegheny River at Red House, N. Y., for 1907 and 1908.

Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.	Gage height.	Discharge.
Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
2.70	145	4.00	1,471	5.30	3,820	7.20	9,400
2.80	220	4.10	1,605	5.40	4,065	7.40	10,080
2.90	295	4.20	1,745	5.50	4,315	7.60	10,790
3.00	380	4.30	1,891	5.60	4,570	7.80	11,530
3.10	470	4.40	2,043	5.70	4,830	8.00	12,300
3.20	560	4.50	2,200	5.80	5,100	8.20	13,120
3.30	655	4.60	2,365	5.90	5,375	8.40	13,960
3.40	755	4.70	2,540	6.00	5,660	8.60	14,800
3.50	866	4.80	2,725	6.20	6,245	8.80	15,660
3.60	978	4.90	2,920	6.40	6,845	9.00	16,540
3.70	1,095	5.00	3,130	6.60	7,460	10.00	21,100
3.80	1,216	5.10	3,350	6.80	8,090	11.00	26,200
3.90	1,341	5.20	3,580	7.00	8,740	12.00	31,800

NOTE.—The above table is not applicable for ice or obstructed channel conditions. It is based on discharge measurements made during 1903 to 1908, and is well defined. Above gage height 3.4 feet the table is the same as that for 1906.

Daily Discharge, Second-feet, of Allegheny River at Red House, N. Y.

DAY.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1908.												
1	6,840	......	3,820	12,300	3,350	6,240	1,100	866	380	145	145	145
2	5,950	......	4,060	10,800	5,660	5,660	978	866	380	220	145	145
3	5,380	......	4,570	10,100	7,150	4,320	978	866	295	220	145	145
4	4,830	......	6,840	8,740	7,150	3,350	2,720	866	295	220	145	......
5	4,060	......	6,540	8,090	6,540	2,720	1,470	755	295	145	220	......
6	3,350	......	6,540	7,150	6,840	2,360	1,220	755	295	145	220	......
7	2,730	......	6,240	6,540	9,400	2,200	1,100	755	220	145	220	......
8	2,360	......	6,240	6,840	12,700	2,040	978	755	220	145	145	......
9	2,200	......	5,660	6,840	11,900	1,740	755	755	220	145	145	......
10	2,200	......	5,100	6,540	10,800	1,470	655	655	220	145	145	......
11	2,040	......	4,060	6,540	8,740	1,340	560	655	145	145	220	......
12	3,130	......	5,100	6,240	6,840	1,220	560	655	145	145	220	......
13	1,540	......	6,240	3,130	5,660	978	470	655	145	145	220	......
14	4,830	a2,000	6,540	2,920	4,570	866	470	655	145	145	295	......
15	3,820	22,100	11,500	2,920	5,100	4,700	380	560	145	145	220	......
16	3,130	25,100	27,300	3,350	6,840	4,320	380	560	145	145	220	......
17	2,920	17,000	21,100	2,920	7,460	2,200	380	1,600	145	145	295	......
18	2,720	16,100	16,100	2,920	6,840	1,220	470	1,890	145	145	295	......
19	2,540	13,500	14,400	3,820	6,240	1,100	470	1,340	145	145	380	......
20	2,360	11,500	18,800	9,740	5,660	978	380	755	145	145	380	......
21	2,360	10,100	14,400	6,840	5,660	866	866	655	145	145	380	......
22	2,200	8,740	12,300	5,660	4,570	866	1,220	655	145	145	380	......
23	2,200	7,460	10,100	5,380	4,060	1,220	1,470	655	145	145	295	......
24	2,040	6,240	8,410	5,100	3,350	6,400	2,720	560	145	145	295	......
25	1,890	5,380	7,150	4,830	3,130	4,570	3,130	560	145	145	295	......
26	a1,700	4,830	9,400	4,320	3,580	2,200	4,830	560	145	145	295	......
27	a1,600	4,570	10,400	3,820	4,570	1,470	3,130	470	145	145	220	978
28	a1,500	4,060	14,800	3,580	4,570	1,220	2,200	470	145	145	220	1,100
29	a1,300	4,060	14,800	3,350	5,660	1,100	1,600	470	145	145	220	1,100
30	a1,200	......	16,500	3,130	5,660	1,100	1,220	380	145	145	220	978
31	a1,100	......	14,800	......	6,240	......	978	380	......	145	......	1,220

a Ice conditions; discharge estimated.

Monthly Discharge of Allegheny River at Red House, N. Y.
[Drainage area, 1,640 square miles.]

MONTH.	DISCHARGE IN SECOND-FEET.			RUN-OFF.	
	Maximum.	Minimum.	Mean.	Second-feet per square mile.	Depth in inches.
1908.					
January	6,840	a1,100	3,000	1.83	2.11
February	25,100	a500	5,890	3.59	3.87
March	27,300	3,820	10,300	6.28	7.24
April	12,300	2,920	5,820	3.55	3.96
May	12,700	3,130	6,340	3.87	4.46
June	6,240	866	2,400	1.46	1.63
July	4,830	380	1,290	.787	.91
August	1,890	380	743	.453	.52
September	380	145	191	.116	.13
October	220	145	152	.093	.11
November	380	145	241	.147	.16
December	1,220	a100	357	.218	.25
The year	27,300	a100	3,060	1.87	25.35

NOTE.—Discharge estimated during the periods of ice conditions.
Discharge Jan. 26 to 31, 1,400 second-feet. Discharge Feb. 1 to 14, 729 second-feet. Discharge Dec. 4 to 26, 228 second-feet.
a Ice conditions; only roughly approximate.

GAGINGS OF CANALS AND FEEDERS.

Current-meter measurements have been made to determine the flow in the existing State canals and feeders during the navigation season of 1908, as described below:

ROCHESTER–LOCKPORT LEVEL OF ERIE CANAL.

Erie canal from the foot of the locks at Lockport to Lock No. 66 at Rochester has a length of 59.55 miles. This portion of the canal derives its water-supply chiefly from Lake Erie and this level has a surface slope sufficient to carry the requisite feed water. The line of the canal from Rochester to Lockport is crossed by numerous small streams, most of which pass underneath the canal prism through culverts. Waste-wiers are located at a number of these stream crossings. In addition, provision is made for the permanent waste of water which is utilized for power development at Albion, Medina and Lockport. In order to determine the amount of this diversion and the necessary water-supply for this level, a series of current-meter measurements have been made, the results of which are given in the following tables.

West branch of Sandy creek, which crosses the canal at Albion, was measured at a highway bridge located about one mile downstream from the canal crossing.

Oak Orchard creek, which crosses the canal at Medina, was measured at a highway bridge three miles north of Medina.

Eighteen-Mile creek, which receives the diversion from the Erie canal at Lockport, was measured at highway bridge one mile northwest of the canal crossing and just above the entrance of the Gulf tributary.

Measurements of the flow in the canal prism were made a short distance up-stream and down-stream from each of the points of diversion, and also at Rochester and Fairport.

No measurements of the flow in the streams which receive the diversion were made above the canal crossing. The ordinary and low-water flow of these streams is small. The results of gagings of Oak Orchard creek above Medina may be found in the State Engineer and Surveyor's Report for 1903, Supplement, pages 54–59.

Current-meter Discharge Measurements of Flow in Erie Canal and Eighteen-Mile Creek at Lockport, N. Y.

DATE.	Hydrographer.	ERIE CANAL.				EIGHTEEN-MILE CREEK.	
		ABOVE LOCKS.		BELOW LOCKS.			
		Stage.a	Discharge.	Stage.b	Discharge.	Stage.c	Discharge.
		Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
1908.							
Feb. 18*.	Clark and Patchke..	7.55	877	......	......	......	....
Feb. 19*.	Clark and Patchke..	......	......	5.00	257	......	....
May 12..	E. C. Niles.........	5.6	772	2.65	606	6.95	339
May 27..	E. C. Niles.........	5.9	1,018	2.4	569	6.90	318
June 15..	A. R. Patchke......	6.7	1,328	3.12	671	6.32	322
June 16..	A. R. Patchke......	......	......	......	......	......	....
July 15..	E. C. Niles.........	8.5	832	2.5	617	7.20	223
Aug. 22..	A. R. Patchke......	......	......	3.15	647	6.70	298
Aug. 23..	A. R. Patchke......	6.55	1,331	......	......	......	....
Sept. 9..	A. T. Clark.........	6.68	952	2.24	808	8.50	31.9
Nov. 14..	A. R. Patchke......	......	......	3.00	703	......	....
Nov. 15..	A. R. Patchke......	6.85	1,028	......	......	......	....

* Measurements made under ice. *a* Distance from reference point to water-surface; reference point is arrow on top of waling of tow-path under up-stream side of bridge. *b* Distance to water-surface from reference point, which is arrow on top of waling of tow-path, under down-stream side of bridge. *c* Distance to water-surface from reference point, which s arrow on top of tie-bar, left-hand end of bridge, down-stream side.

Current-meter Discharge Measurements of Flow in Erie Canal and Oak Orchard Creek at Medina, N. Y.

DATE.	Hydrographer.	ERIE CANAL.				OAK ORCHARD CREEK, BELOW CANAL.	
		EAST OF MEDINA.		WEST OF MEDINA.			
		Stage.a	Discharge.	Stage.b	Discharge.	Stage.c	Discharge.
		Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
1908.							
Feb. 20..	Clark and Patchke..	......	......	*6.30	150	......	....
Feb. 21..	Clark and Patchke..	*6.80	74.9	......	......	......	....
May 12..	E. C. Niles.........	2.55	566	3.00	572	6.25	665
May 27..	E. C. Niles.........	2.70	536	3.15	592	8.40	147
June 16..	A. R. Patchke......	2.90	513	2.68	547	8.45	122
July 15..	E. C. Niles.........	2.80	447	3.20	542	7.50	127
Aug. 22..	A. R. Patchke......	3.05	458	2.92	536	7.58	125
Sept. 9..	A. T. Clark.........	2.90	582	2.65	662	8.00	128
Nov. 13..	A. R. Patchke......	3.00	446	2.70	519	......	....

* Measurements made under ice. *a* Reference point is edge of rounding on top of concrete retaining wall along tow-path, bridge No. 138. *b* Reference point is edge of wall along tow-path, bridge No. 140½. *c* Reference point is outside tie-bar, left-hand, down-stream side of bridge.

Current-meter Discharge Measurements of Flow in Erie Canal and West Branch of Sand Creek at Albion, N. Y.

DATE.	Hydrographer.	Erie Canal. East of Albion. Stage.a	Erie Canal. East of Albion. Discharge.	Erie Canal. West of Albion. Stage.b	Erie Canal. West of Albion. Discharge.	West Branch of Sandy Creek, Below Canal. Stage.c	West Branch of Sandy Creek, Below Canal. Discharge.
		Feet.	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
1908.							
Feb. 22*.	Clark and Patchke.	6.55	24.4	6 60	61.7	......	....
May 11..	E. C. Niles.........	1.90	481	2.00	502	6.10	106
May 26..	E. C. Niles.........	2 25	355	2.30	474	6.30	63 5
June 17..	A. R. Patchke.....	2 25	359	2.50	433	6 28	58.5
July 14..	E. C. Niles........	2.30	337	2.30	429	5.60	83.2
Aug. 20..	A. R. Patchke......	......	......	2.50	427	......	......
Aug. 21..	A. R. Patchke.....	2.45	369	......	......	5 40	72 6
Sept. 10..	A. T. Clark........	2.25	423	2.30	456	5.40	73 6
Nov. 12..	A. R. Patchke......	.....	......	2.64	444	......	....
Nov. 13.	A. R. Patchke.....	2.32	354	......	......	......	....

* Measurement made under ice. *a* Distance to water-surface from a reference point, which is an arrow painted on tow-path vertical wall, left-hand, down-stream side of bridge. *b* Distance to water-surface from a reference point,—point of arrow, tow-path vertical wall, left-hand, down-stream side of bridge. *c* Distance to water-surface from reference point,—arrow on top of coping, bridge-seat, up-stream side, left-hand abutment.

Current-meter Discharge Measurements of Flow in Erie Canal at Rochester, N. Y.

DATE.	Hydrographer.	Erie Canal. West of Aqueduct. Stage.a	Erie Canal. West of Aqueduct. Discharge.	Erie Canal. East of Aqueduct. Stage.a	Erie Canal. East of Aqueduct. Discharge.
		Feet.	*Second-feet.*	*Feet.*	*Second-feet.*
1908.					
May 13..	E. C. Niles..................	e2.15	318	b1.20	52 7
May 28..	E. C. Niles..................	e3.00	446	b1.85	121
June 13..	A. R. Patchke..............	e3.30	414	b1.95	171
June 13..	A. R. Patchke...............	....	....	c2.85	231
July 14..	A. R. Patchke...............	....	....	b1.52	168
July 14..	A. R. Patchke...............	....	....	c2.85	231
July 15..	A. R. Patchke...............	e2.72	416	....	....
Aug. 19..	A. R. Patchke...............	e2.72	188	....	....
Aug. 20..	A. R. Patchke...............	....	....	b1.85	231
Aug. 20..	A. R. Patchke...............	....	....	c2.82	291
Sept. 11..	A. T. Clark..................	....	....	b1.95	248
Sept. 11..	A. T. Clark..................	....	....	d4.5	171
Sept. 12..	A. T. Clark	e2 95	334	....	....
Nov. 11..	A. R. Patchke...............	e2.70	225	....	....
Nov. 12..	Horton and Patchke.........	e2.60	294	b1.65	148

a Below reference point. *b* Measurement made at Alexander St. *c* Measurement made at Monroe Ave. *d* Measurement made at Highland Ave. *e* Measurement made at Plymouth Ave.

Current-meter Discharge Measurements of Erie Canal at Parker St., Fairport, N. Y.

DATE.	Hydrographer.	Meter No.	Area of section.	Mean velocity.	Discharge.
			Square feet.	*Ft. per second.*	*Second-feet.*
1908.					
June 12...	Horton and Patchke	764	555	0.310	172
July 15...	A. R. Patchke	462	585	0.156	91.5
Aug. 19...	A. R. Patchke	360	578	0.096	55.4
Sept. 11...	A. T. Clark	764	575	0.228	131

UTICA–SYRACUSE LEVEL OF ERIE CANAL.

From Schuyler street lock, Utica, to the upper lock at Syracuse, a distance of 55.94 miles, the Erie canal forms a single summit level at elevation 429.6. This level receives several important feeders. Proceeding from east to west these are Oriskany feeder at Oriskany; Black River canal and Mohawk river feeder at Rome; Chittenango feeder at Chittenango; Limestone creek feeder near Fayetteville, and Orville feeder from Butternut creek at Orville.

It is intended to retain this level of the canal, in conjunction with the various feeders, as one source of water-supply for the Barge canal. In order to determine the water-supply available from these sources, gaging stations have been established on the principal tributary streams, as described in this report. In addition, several measurements of the flow of the canal at the eastern and western ends of this level were made during the navigation season of 1908, as listed below.

Current-meter Discharge Measurements of Erie Canal at Headson's Landing, east of Syracuse, N. Y.

DATE.	Hydrographer.	Meter No.	Area of section.	Mean velocity.	Discharge.
			Square feet.	*Ft. per second.*	*Second-feet.*
1908.					
May 16...	E. C. Niles	360	539	0.164	88.3
June 2...	E. C. Niles	360	516	0.032	16.4
July 18...	A. R. Patchke	462	539	0.198	107

Current-meter Discharge Measurements of Flow in Erie Canal at Rome, N. Y.

DATE.	Hydrographer.	Erie Canal. East of Rome. Stage.*a*	Erie Canal. East of Rome. Discharge.	Erie Canal. West of Rome. Stage.*b*	Erie Canal. West of Rome. Discharge.
		Feet.	*Second-feet.*	*Feet.*	*Second-feet.*
1908.					
May 11...	Weeks and Clark	3.30	231	14.40	100
June 18..	Weeks and Clark	3.25	282	14.40	39.6
July 19..	A. R. Patchke	......	......	14.20	16.7
July 20...	A. R. Patchke	3.75	290	......	......
Aug. 26...	A. R. Patchke	3.20	186	13.78	29.8
Sept. 9...	Niles and Overocker	3.10	167	*c*9.45	71.6
Sept. 14...	A. R. Patchke	3.22	130	......	......
Sept. 15..	A. R. Patchke	......	......	13.90	77.8
Oct. 6...	Weeks and Quinn	3.35	150	14.35	169

a Distance to water-surface from a reference point, which is arorw painted on retaining wall, under tow path, down-stream end of bridge. *b* Distance to water-surface from a reference point, which is top of floor of bridge, up-stream side, sta. "O". *c* Nail in side of box culvert under tow-path, about 15 ft. down-stream from bridge.

Current-meter Discharge Measurements of Erie Canal, west of Stanwix.

DATE.	Hydrographer.	Meter No.	Area of section.	Mean velocity.	Discharge.
			Square Feet.	*Ft. per second.*	*Second-feet.*
1908.					
June 18...	E. F. Weeks	462	398	0.709	282
July 20..	A. R. Patchke	462	440	0.659	290
Aug. 26...	A. R. Patchke	360	392	0.474	186
Oct. 6..	Weeks and Quinn	462	394	0.381	150

Current-meter Discharge Measurements of Oriskany Feeder at Oriskany, N. Y.

DATE.	Hydrographer.	Meter No.	Area of section.	Mean velocity.	Discharge.
			Square Feet.	*Ft. per second.*	*Second-feet.*
1908.					
May 11...	Weeks and Clark	462	80.0	0.664	53.1
May 27...	A. T. Clark	462	87.2	0.057	4.94
June 18...	E. F. Weeks	462	83.2	0.361	30.0
Sept. 15...	A. R. Patchke	360	92.8	0.211	19.6

Black River Canal and Feeder at Boonville, N. Y.

A portion of the water-supply of the summit level of Erie canal is derived from the headwaters of Black river through a feeder having its intake at the State dam at Forestport and delivering its flow to the summit level of Black River canal at Boonville. A portion of this flow passes northward, supplying the Black River canal from Boonville to the head of slack-water navigation

of Black river at the foot of Lyons falls. The remaining flow passes southward through Black River canal, which enters Erie canal at Rome. A portion of this diversion is wasted into the Mohawk river and, in addition, water is diverted from Mohawk river into the Black River canal through the Delta feeder. During low-water periods the entire southward diversion from Black river, together with the entire yield of Mohawk river above Rome, is taken into the Erie canal at Rome, through Black River canal and the feeder located at Rome State dam. In order to determine the amount of diversion and water-supply available from the Forestport feeder, current-meter measurements were made during 1908 in the Forestport feeder at a farm bridge near Sperry Hill, one mile northeast from Boonville. Measurements of northward flow in Black River canal were made at a farm bridge one-half mile north of Boonville and measurements of the southward flow at a farm bridge about three-quarters mile southeast from Boonville.

Current-meter Discharge Measurements of Flow in Black River Canal at Forestport Feeder at Boonville, N. Y.

DATE.	Hydrographer.	BLACK RIVER CANAL.				FORESTPORT FEEDER.	
		NORTH OF BOONVILLE.		SOUTH OF BOONVILLE.			
		Stage.a	Discharge.	Stage.b	Discharge.	Stage.c	Discharge.
1908.		*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*	*Feet.*	*Second-feet.*
June 18..	A. T. Clark........	1.20	38.9	1.25	221	4.42	333
July 1..	A. T. Clark........	1.17	76.9	1.55	224	4.30	344
July 20..	A. R. Patchke.....	......	......	......	......	4.26	287
July 21..	A. R. Patchke......	1.78	76.2	1.49	214	......	....
Aug 25..	A. R. Patchke......	3.70	6.30	1.50	215	4.38	253
Oct. 3..	A. R. Patchke......	1.50	36.9	1.45	192	4.35	265
Sept. 8..	Niles and Overocker	1.75	37.2	1.60	202	4.35	252
Sept. 14..	D. W. Overocker...	......	......	1.55	181	4.33	280
Oct. 19..	E. C. Niles.........	1.50	48.0	1.45	215	4.25	281

a Distance to water-surface from a reference point, which is top of mud sill of bent or abutment, left-hand, up-stream side of bridge. *b* Distance to water-surface from a reference point, which is top of mud sill of bent or abutment, right-hand, down-stream side of bridge *c* Reading on gage, graduated to feet and inches, left-hand, up-stream side of bridge.

ROCKY RIFT FEEDER AT INDIAN CASTLE.

Current-meter measurements are made to determine the diversion from Mohawk river for Erie canal through Five-mile, or Rocky Rift feeder at Lansing farm bridge, as listed below.

Current-meter Discharge Measurements of Rocky Rift Feeder near Indian Castle.

DATE.	Hydrographer.	Gage height.	Area of section.	Mean velocity.	Discharge.
			Square Feet.	*Ft. per second.*	*Second-feet.*
1908.		*Feet.*			
Sept. 13...	A. R. Patchke..............................	5.66	125	2.62	328
Oct. 5...	Weeks and Quinn..............................	5.60	128	2.74	351

KING'S CANAL AT WATERFORD, N. Y.

King's canal, or King's ditch, is a water-power head-race, which derives its water-supply from a dam near the head of the fourth branch, or sprout of the Mohawk river at Waterford. This is the most northerly of the fan-shaped group of outlets, through which Mohawk river debouches into the Hudson river. Current-meter measurements are made at the uppermost bridge crossing the power canal above the intakes of all the mills. Two gages, one located in King's canal near the down-stream end and the other located in the Mohawk river below the mills, have been read twice each day by this Department.

Current-meter Discharge Measurements of Flow in King's Canal at Waterford, N. Y.

DATE.	Hydrographer.	KING'S CANAL ABOVE MILLS.	
		Stage.	Discharge.
		Feet.	*Second-feet.*
1908.			
Sept. 16	A. R. Patchke...........................	8.46	50.3
Sept. 21...........	Weeks and Patchke...........................	4.40	354
Sept. 21...........	Weeks and Patchke...........................	6.35	325
Sept. 24...........	Weeks and Patchke...........................	7.22	176
Sept. 28...........	Weeks and Patchke...........................	4.78	371

Respectfully submitted,

ROBERT E. HORTON,

Resident Engineer.

INDEX.

Annual Report of the State Engineer and Surveyor of New York, 1908.